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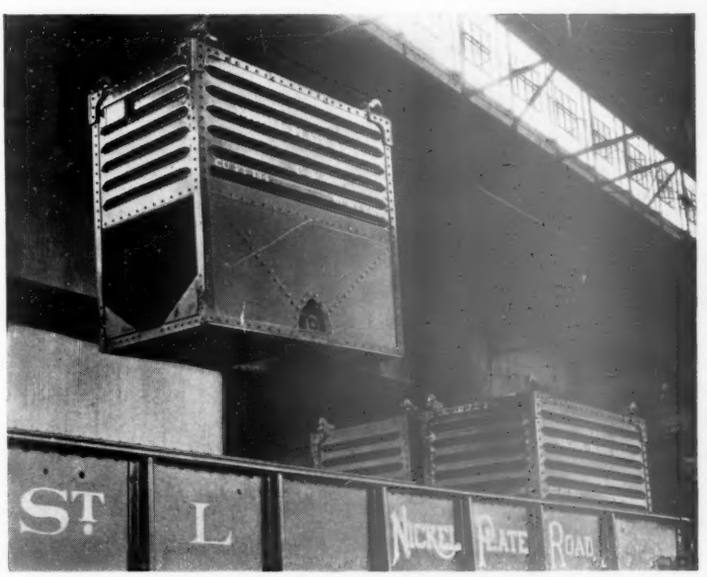

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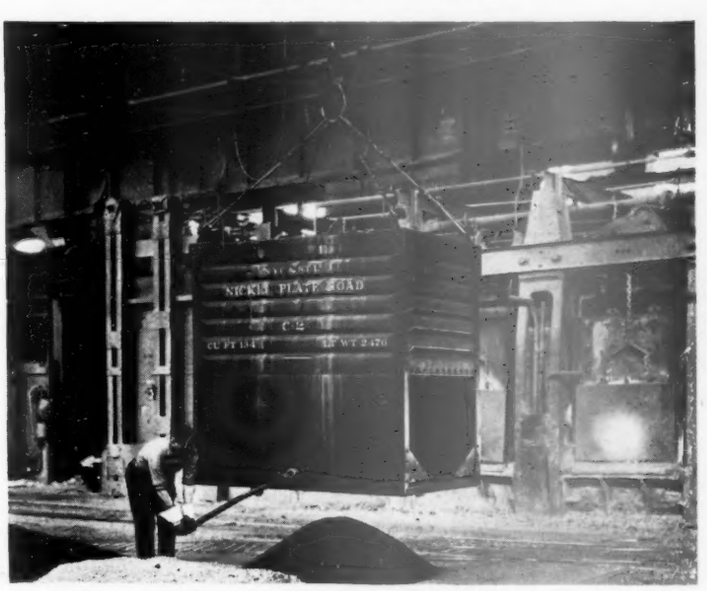

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Published every Saturday by the Simmons-Boardman Publishing Corporation, 1309 Noble Street Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues, and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free. United States, U. S. possessions and Canada: 1 year, $6.00; 2 years, $10.00; foreign countries, not including daily editions: 1 year, $8.00; 2 years, $14.00.

Single copies, 25 cents each.

H. E. McCandless, Circulation Manager, 30 Church St., New York, N. Y.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

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"To Provide Means for Operating Railroad Switches with Certainty and Free from Danger"—

PATENT OFFICE.

IMPROVEMENT IN SWITCH-SIGNALS.

Letters Patent No. 157,308, dated December 1, 1874; application filed September 26, 1874.

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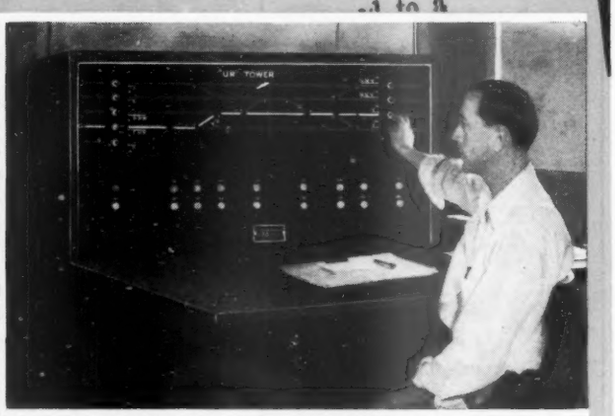

—is abstracted from the first American letters patent, granted in 1874, for an interlocking machine. The first machine built under this patent was the forerunner of the progressive improvements and developments in interlocking design, resulting in the efficient interlocking and control systems of today, all of which fulfill the above quotation. » » » » »

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1881 **Union Switch & Signal Co.** 1937

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RAILWAY AGE

Wage Differences Complicate Railways' Competitive Problem

Railway unionists, pressing forward their demands for higher wages and improved working conditions, and railway managers with a humanitarian sympathy for the aspirations of their fellow-workers in the ranks, should give heed to the study on Comparative Labor Standards in Transportation, recently issued by the Federal Co-ordinator's Section of Labor Relations. This study makes clear that, regardless of the desires of railway labor for more money and more favorable hours and regardless of concessions in this direction which railway managements might be disposed to make—nevertheless, competition of less-well-situated labor in other forms of transport sets definite and practical limits to improved conditions which can be made to "stick" as far as railway labor is concerned.

For transportation is a highly competitive business; and shippers shift their patronage from one agency to another very rapidly when a saving in their freight bills can thus be made. Railway labor costs of necessity must be reflected in railway rates; and it is unsafe to set railway rates or wages without regard to rates and wages in competitive transport, lest the benefits to railway labor of higher wages and improved working conditions be more than offset by the loss of jobs which follows when additional labor costs push rates to too high a competitive level.

True Comparisons Difficult

The Co-ordinator's study makes abundantly clear how difficult it is to make exact comparisons between the working conditions in the several forms of transportation. While the movement of goods and passengers is involved in all of them, the degree of skill required and the attendant conditions under which work is performed differ widely in the several agencies. Nevertheless, none will be able to deny the study's conclusion "that labor relations in water, motor vehicle and pipe line transportation have not been placed on as satisfactory or as permanent a basis as have such relations in the railroads industry." Likewise it would be difficult to overstress the importance of the report's conclusion that "these differences have a bearing on competitive conditions."

Granting the difficulties involved in making direct and valid comparisons between specific railroad occupations and those in competing forms of transport, nevertheless some significant general differences are brought out in the study. Of the more important of these may be listed the following:

1. Wage payments are relatively a much more important item of expense to the railroads than to competing forms of transport, for the reason that the ratio of labor expense to total operating expenses is 60 per cent in the case of the railroads, and, by comparison, less than 48 per cent in trucking, 36 per cent in bus operation and 38 per cent in the case of water lines.*

Railways Have Large Unskilled Force

2. In any comparison of average wages in railroading with average wages in highway transport, the railways are at an immediate disadvantage, because the railways maintain their own roadway, necessitating a large force of relatively unskilled labor, whereas roadways for motor vehicles are maintained at public expense, and the average wage paid in motor transport is thus not diluted, as in the case of the railways, by a large admixture of unskilled workers.

3. While only 10 to 12 per cent of railway employees

* An interesting contrast in liberality of dealing with employees is provided by the recent protest of bus and truck operators at the social security tax, which they claim is unjust to them because of the large percentage of their revenues which is paid out in wages. At the same time that this protest was being made, the railways, which pay out a much larger percentage of their revenues in wages than do the highway carriers, were voluntarily negotiating with the railway unions a pension plan, with accompanying increases in railway labor costs.

work more than 48 hours a week and only 3 per cent over 56 hours, 52 per cent of all bus employees and 47 per cent of all truck employees worked over 52 hours a week in one survey made by the Co-ordinator's staff. While a later sample showed some amelioration in these hours, nevertheless the report says that its data "relate for the most part to better than average conditions." While the 8-hour day has been adopted by a number of water lines, this usually involves the 7-day week, or 56 hours, and there are many vessel and motor carrier employees who are still working 12 or more hours per day.

4. Despite the fact that the railroads by the nature of their business have a larger percentage of unskilled labor than competing forms of transport, nevertheless employees earning 35 cents per hour or less make up only about 10 per cent of the total payroll; and the average hourly earnings of all employees in railroad service were found to be about 64 cents an hour as compared with 58 cents in bus service and 53 cents in truck service.

Can Motor Drivers Be Compared with Engineers?

5. While a direct comparison between truck and bus drivers and locomotive engineers in road freight and passenger service is probably not wholly satisfactory, nevertheless average hourly earnings of about 60 cents for motor transport employees and $1.84 (passenger) and $1.39 (through freight) for locomotive engineers may at least indicate some of the difficulties the railroads face in attempting to keep branch line and other lightly patronized trains in service in competition with bus and trucks, hauling comparable loads at much lower labor costs.†

6. Comparison between railway and water carrier wage and working conditions is complicated by the fact that vessel employees receive board and a place to sleep as part of their wages. On the other hand, their monthly earnings, in comparison to the hours they put in, are not such as to excite the envy of most classes of railway employees. For example, the hourly earnings of able seamen are just about comparable with those of unskilled labor in railroad transportation.

7. In the case of air transport, all-inclusive comparisons are complicated by the inclusion of pilots, co-pilots, and hostesses, whose hours are naturally relatively short because of the nature of their occupation. Further complications are introduced because of the high hourly earnings of flying personnel, for whom the railways have no counterpart. But wages and working conditions of non-flying staff are not such as to prove attractive to most railway employees.

Wages of Railroad and Automotive Mechanics

8. Railroad metal-working mechanics, the study discloses, earn 82 cents an hour, as compared with 60 to 66 cents per hour by bus and truck mechanics. While there is some difference in the work, of course, the report says that the difference in compensation "appears to be too great to be accounted for by occupational dissimilarities."

9. Likewise for clerical employees, the report finds that "it appears not unreasonable to place railroads at the top of the list" in hourly earnings.

10. Unlike the railways and other forms of transportation, overtime, where bus and truck operators compensate for it at all, is in most instances paid at straight time rather than punitive rates.

11. On the average, railroad employment, because of the working of the seniority rule, is much more dependable than that in water line service, or in highway or air transport. These three competitors of the railways want young men, without being able to hold out any promise for continued employment for older men. And, of course, none of them have pension plans, such as the railways have recently agreed to provide, except such as are contemplated under the social security act.

The above list of important differences between the lot of railway employees and their fellows in competing forms of transport is not complete, but it is sufficient at least to necessitate the conclusion that, on the average, the lot of the average railroader is a happy one indeed, by comparison. Coupled with the fact that these other transport agencies are enabled to compete with the railways, and thus jeopardize railway employment, in part by reason of the lower labor costs they have to meet, this observation must temper with conservatism any contemplated increase in present railway labor costs. Altruism is not needed to dictate this course, but only a realistic recognition of the facts of competitive labor costs in transport which this report discloses, and the effect that such labor cost differentials have on the diversion of traffic. Railroad jobs will be the price paid if railway labor in its demands gets too far ahead of wages and working conditions obtaining in competing forms of transport.

Labor Benefits More from Prosperous Employer Than from Unionization

One agency of transportation—pipe lines—appears from this report to stand above all others in its labor standards for comparable occupations. And, as the study points out, it is the financial strength and the

† Wage competition between buses and trucks, on the one hand, and trains on the other is obviously not a controlling factor where heavy trainloads are secured, but only in the effect which such wage differences have on average over-all rates and costs, and in their effect on "marginal" trains, i.e., those barely paying out-of-pocket expenses. These are the trains that "full" crew laws, mileage minima and "featherbed" rules—and low wages on the highway—put out of business, and along with them the trainmen, enginemen, section hands, freight handlers, mechanics, clerks and others who have jobs when freight and passengers move by rail. If the unions are seriously interested in preserving railway jobs, as they obviously are in securing nominally favorable working conditions, should they not consider liberalizing the working rules in cases where stringent insistence upon them necessitates pulling off trains and laying off employees?

integration of the pipe line companies—not the strength of organized labor—which are largely responsible for the favorable conditions which obtain for pipe lines employees. If this experience is any criterion, then it would appear that *railroad employees have more to gain from efforts to assure greater prosperity to the railroads than they have by directing their main attention to securing a larger share of total revenues.* Beneficial to the worker as union activity in many cases doubtless has been, it still appears that a prosperous employer would be a still greater benefit to him. At any rate, pipe line experience appears so to demonstrate.

Federal Crossing Program Moves Ahead

Commendable progress has been made in the $200,000,000 federal emergency relief program for eliminating hazards at railway-highway grade crossings. As of February 28, as pointed out in an article which appeared in the issue of the *Railway Age* of March 13, 1,001 separation and reconstruction projects had already been completed under the program at a total cost of approximately $58,000,000, and 1,014 additional projects, involving a cost of approximately $100,000,000 were under construction. Furthermore, another 157 such projects had been approved for construction and 836 crossings had been scheduled for the installation of protective devices. The total cost of the projects completed, under way or approved for construction by February 28, less than two years after the appropriation for the work was authorized, amounted to $171,830,000, which represents about 85 per cent of the money allotted for the program as a whole.

Obstacles Should Be Removed

In many respects, this is a splendid record, which fully justifies the decision on the part of the federal administration to include the elimination of hazards at railway-highway grade crossings in its group of public works projects to stimulate business activity and to increase employment. However, enviable as has been the record thus far generally, one can hardly overlook the fact that relatively slow progress has been made in a few states as regards both elimination and protection projects. Whether this lack of progress is due to politics, inadequate organization or initiative on the part of state highway departments, difficulty in acquiring necessary lands for improvement projects, disputes over methods of handling the work, or complicated methods of letting contracts for materials and equipment, all of which have been mentioned by authoritative sources as among the principal causes of delays, these obstacles should be removed by appropriate action, taken, if necessary, by the Secretary of Agriculture who has charge of administering the funds. Lest we appear in certain quarters to be too harsh in this criticism, let it be said that these delays which have occurred have been equally disturbing to the United States Bureau of Public Roads, which, acting for the Secretary of Agriculture, has exercised every effort within its control to speed up the work, and which has constantly urged the greatest co-operation and activity on the part of the individual states to the end that the entire $200,000,000 allotted might be expended by July 1, 1937, as called for under the act which made it available.

In spite of such delays as have occurred, the federal program has been an outstanding development in the interest of the public. That it has been effective far beyond the giving of employment to many thousands of men, and will continue to be effective long after employment ceases to be a problem, is seen in the fact that, through the grade crossing improvement work which has already been carried out with federal appropriations since 1933, it is estimated that approximately 7,000,000 people, equivalent to the population of the City of New York, are relieved daily from the hazards of unprotected grade crossings.

Sensing the popular appeal and approval of this class of work, if not public demand for it, in addition to its all-around effectiveness in promoting the safety of the public and in increasing employment widespread over the country, Congress saw fit to extend the federal program over the next two years, having on June 16, 1936, appropriated an additional $50,000,000 for grade crossing work in each of these years. The important feature of this appropriation is the fact that it was made in connection with the regular federal-aid highway program, which establishes a new departure from long established principles of federal-aid highway policies, and a precedent for continued appropriations for grade crossing work in the future.

Accident Toll Justifies Additional Expenditures

That there is need for the expenditure of the additional money appropriated for the next two years, and that there will be a need for large expenditures for grade crossing elimination and protection work for many years to come, is seen in the rising accident record at grade crossings in spite of all that has been done thus far in the way of elimination and protection work and in educating the public in safety practices at crossings. According to the grade crossing accident figures compiled by the Interstate Commerce Commission for the year 1936, there were 4,277 grade crossing accidents in that year, as compared with 3,933 in 1935, an increase of 344. The accidents in 1936 resulted in a total of 1,786 fatalities and 4,930 injured, as compared with a total of 1,680 fatalities and 4,658 injured in 1935. Fatalities resulting from accidents reached an eight-year monthly peak in November, 1936, when

a total of 243 persons were killed at grade crossings, an increase of 69 over the number killed in the same month in 1935, and only six fewer than the number killed in the peak month, January, 1929.

The public no longer lays the sole responsibility for this mounting accident record on the railways. The same can now be said to a large degree also of state and federal highway authorities, as indicated in an address by Thomas H. MacDonald, chief, United States Bureau of Public Roads, made before the recent convention of the American Railway Engineering Association, and abstracted in the *Railway Age* of March 27. The public recognizes the changed conditions on the highways and its own responsibility for improving this bad condition. With this change in attitude, it is to be expected that federal appropriations for eliminating hazards at railway-highway grade crossings will continue from year to year, and, furthermore, that state laws will be modified to bring about a more equitable distribution of costs in other than federal projects, so the whole program in the future may be expedited.

Equipment Orders Far Ahead of Last Year

Domestic orders have been reported in *Railway Age* during the first three months of 1937 for nearly 50 per cent more locomotives, three times as many freight cars and five times as many passenger-train cars as were reported during the corresponding quarter of 1936. This was the picture rounded out by March orders for 29 locomotives, 6,200 freight cars and 162 passenger-train cars. In fact the three-months domestic passenger-train car total—386— is 79 cars above 1936's 12-months figure of 307.

The 29 locomotives ordered here last month brought the 1937 total to date to 108, including 92 steam locomotives and 16 Diesels. This, as stated at the outset, is nearly 50 per cent more than the total of 73—63 steam and 10 Diesels—reported during the first quarter of 1936. In addition inquiries were outstanding at the close of March for 40 locomotives—22 for domestic service and 18 for export, and plans had been announced for the acquisition of about 15 others for domestic service.

Thus far in 1937 orders for 27,613 freight cars have been reported—more than three times the 8,913 ordered during the corresponding quarter of last year, and a larger total than that for the entire 12 months of any year since 1930, save 1936 when 67,544 freight cars were ordered. But in 1936 it required the orders reported up to the first week in July to cross the 27,000 mark which this year's business crossed at the end of March. Furthermore there were outstanding at the close of last month inquiries for more than 12,000 freight cars—11,000 for domestic service and 1,000 for export.

The 162 passenger-train cars ordered in March produced the 386 total for 1937 to date, which, as stated in the foregoing, tops 1936's 12-months figure of 307 and is more than five times the 69 ordered during last year's first quarter. Furthermore it is a larger total than that reported for the entire 12 months of any year since 1930, except 1934—and it is but two cars short of equaling the latter's 388. March also brought to Canadian builders orders for 30 passenger-train cars which followed six lean years (1931 to 1936) during which manufacturers in that country had received orders for only 37 passenger-train cars. At the close of March inquiries were outstanding for 89 passenger-train cars—39 for domestic service and 50 for Canada.

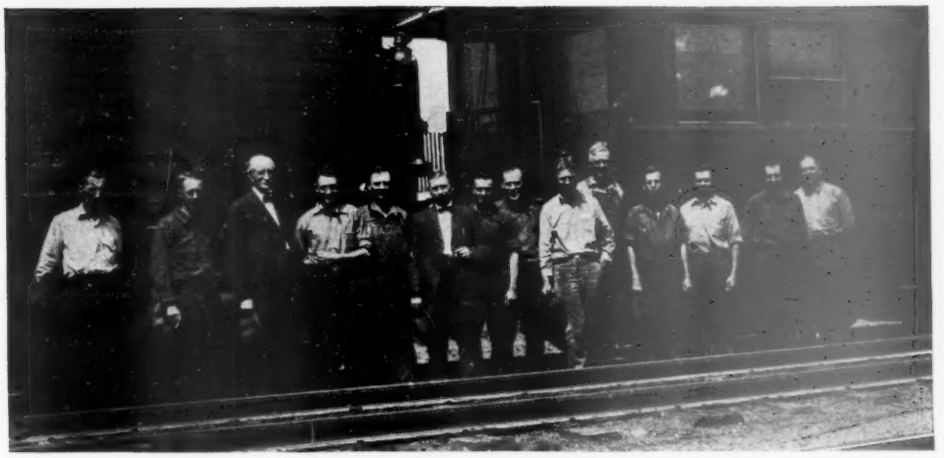
Railways Fortunate in Their Unions

That there must be bases of selection among unions has never been more apparent to the general public than at the present time. There are, upon the one hand, and as examples, the great railroad brotherhoods. They are not always wisely directed; they at times submit grossly exaggerated demands; their leaders frequently make public exhibitions of arrogance which the initiated commonly consider as intended to impress the more volatile among the rank and file, and thus are not unconnected with the inner politics of the organizations where new men are continually pushing forward to displace the existing leaders and supporting their pretensions by proposing extravagant demands. Nevertheless, if, as assumed for the purpose of this discussion, collective bargaining through unions has become a necessity of an economic organization largely conditioned by public opinion, these organizations are among the best, their managements are in the main honest and usually reliable, and experience has demonstrated the practicability of dealing with them in fairly reasonable and stable negotiations.

At the other extreme are organizations such as those now under judicial scrutiny in New York City, with which no employer ought to be required to deal, and the existence of which society can afford neither to encourage nor to tolerate. There are such organizations, purporting to represent labor groups, all over the United States. In reality they represent criminals, gangsters and gunmen who have fastened themselves in parasitic fashion upon industry and labor, bleeding both indiscriminately and to the very limit of endurance in order that these creatures, who prey upon all whom they can cajole or coerce, may live in comparative ease and affluence until, as usually happens, their vicious careers are ended by the knife or the sub-machine gun of aspiring rivals of equally anti-social and criminal dispositions.

Between these extremes are to be found practically all the organizations of the United States which are now putting themselves forward to represent, in collective bargaining, the employees of our various enterprises and industries.

—From the Commercial & Financial Chronicle.



Test Party and Train Crew Conducting Test with Electric Locomotives—Dr. Talbot Is the Third Man from the Left

The Relation Between Track and Rolling Stock*

A discussion of the trends in track construction and the effects thereon of locomotive and car design

By Dr. Arthur N. Talbot†

TRACK is a flexible and elastic structure. Under the loads of locomotive and car wheels the rail bends, the wood of the tie under the tie plate compresses and there is bending lengthwise of the tie, the ballast and roadbed under and between ties compress so that in addition to movement due to the play or free space between tie and rail there is a downward movement of the rail which is called the rail depression (an important element in the analytical treatment of the problem). The "rail depression" at some distance from the nearest wheel may be upward (negative), giving rise to the common expression "wave motion." The unloaded rail quickly rises to its original position—the whole structure in good track is "elastic," for very many applications of load are required to give appreciable permanent depression to the track.

The Stresses in Track investigation, in its first report, developed a mathematical analysis for calculating the stresses in the rail and depressions of the rail at points at and near the wheel loads which may be applied to any given grouping and spacing of the wheel loads of a locomotive or coupled cars for given conditions of the stiffness of that part of the track structure below the rail, as measured by the "modulus of elasticity of rail support." Under assumed conditions of track and loading the stresses and depressions calculated by means of this analysis are known to be substantially correct. The interpretation of analyses and tests have resulted in many findings of interest and value. Some of them will be mentioned in what must be a hap-hazard and incomplete way.

So far as stresses in rail are concerned, one important fact was early established—that the maximum bending stresses in rail under the loads of closely spaced wheels (like the driving wheels of a Mikado locomotive or the truck wheels of two closely coupled freight cars) are considerably less than the stresses that would be produced by a single wheel load like that of a trailer that is well away from another wheel. Please remember, however, that this decrease applies only to the so-called bending stresses. The bearing stresses in the rail under the wheel (stresses which are related to the stresses tending to develop transverse fissures) are not particularly affected by this reduction in bending effects, and these bearing load effects tend to control or limit the maximum desirable wheel load. It may be remarked that in other ways too the ordinary bending stresses in the rail under steady vertical pressures may not govern the limiting wheel loads for good track.

Depression of Rail and Stiffness of Rail Support

A property of track which has not received adequate attention in discussions is the stiffness of the rail support; that is, its resistance to depression or downward movement under the application of loads on the rail. This property and the shape of the depression curve throughout the length of the locomotive and under and between the trucks of cars, as determined by the magnitude of the wheel loads and their spacing along the track, tell an important story of the way in which the track has received the load and the possible punishments that may

* A paper prepared for presentation before a joint meeting of the Western Railway Club and the American Railway Engineering Association at Chicago on March 17.

† Professor Emeritus, University of Illinois, and Chairman, Joint Committee on Stresses in Railroad Track of the American Railway Engineering Association and the American Society of Civil Engineers.

be applied to it, and may suggest or reflect the reacting relation on the rolling stock above it.

The magnitude of this depression of the rail support is not large on the best track—is not even as great as it appears to the ordinary eye as the train goes by. Disregarding the play between rail and tie and taking only the net lowering produced by the loads of an ordinary Mikado locomotive, the rail will depress say ⅛ in. on a very stiffly built rail support (tie plates, ties, ballast and roadbed) (modulus of 4000), and similarly it may depress ¼-in. on an ordinarily well ballasted and well kept track (modulus of 2000), though of course on a loosely ballasted and poorly maintained track the depression may be ½ in. or even considerably more.

It has been found that the maximum depression made by a group of closely spaced wheels is dependent almost solely upon the stiffness modulus of the rail support. Doubling the modulus of elasticity of rail support will halve the amount of the maximum depression. The stiffness of the rail or the size of its section has little effect on the magnitude of the depression of the closely spaced group of wheels. It will have an effect on the depression at a lone wheel such as the trailer, which by itself gives an undesirable form of depression curve, but this may be ironed out very advantageously when a two-axle trailer truck is used.

The shape of the curve of depression may be said then to be dependent upon the stiffness referred to and to the spacing and grouping of the wheel loads. A grouping of wheels and the spacings might be chosen that would form a smooth regular depression from the first wheel to the last of a group, or they may produce a series of ups and downs along the rail. An approach to the smoothened curve, which may be obtained by suitable wheel spacing in many cases, will be advantageous. It is apparent that the destructive effect of the load on the rail support (effect on the integrity of the tie and ballast as evidenced by necessary track maintenance) will depend in some measure on the amount or magnitude of the up-and-down movement within this structure as each wheel or each group of wheels passes by. The shape of the depression curve (as well as its depth) may possibly affect the tractive resistance somewhat. Other things being equal, then, the greater the stiffness of the rail support, the less the maintenance charges caused by traffic. Solid roadbed, thoroughly compacted ballast, and substantial ties, all put into best line and surface, will contribute to low cost maintenance.

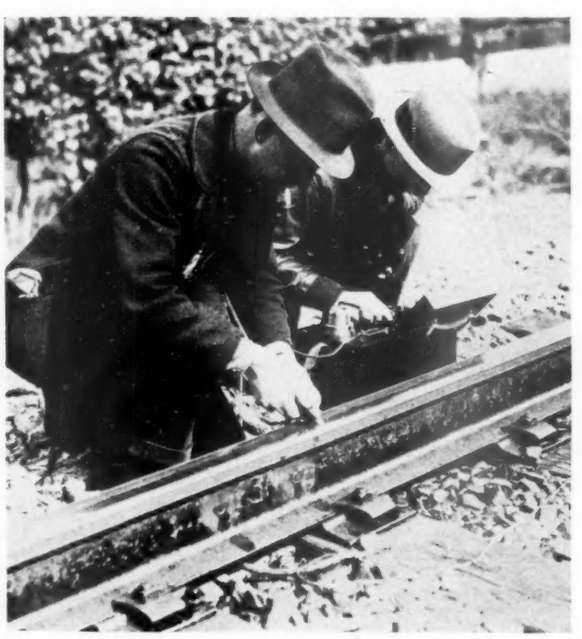
Value of Heavy Rail

Much interest has been taken by maintenance engineers and executives in the value of increased rail section, heavier rails. What is the source of the advantages of heavier rail? For substantial and well-kept track substructure (still using this expression for ties, ballast and roadbed), a section of rail will be reached when the bending stresses in the rail are reasonably moderate in magnitude for carrying well designed and well maintained rolling stock. I can not take time to discuss the numerical value of these stresses but they are reasonably moderate for medium weights of rail under the conditions named. It is true also that the maximum rail deflections along the group of closely spaced wheels in an ordinary freight train are little affected by increasing the weight of rail, though an accompanying increase in the stiffness of the substructure made at the same time itself will decrease the maximum rail depression approximately inversely to the relative stiffnesses of the supports before and after. So far as I know, little study has been given to the relation between size of rail and the magnitude of bearing stresses on the head of the rail, but between moderate weight and heaviest rails there is probably little difference. Nor do I know of definite and adequate statistics on the rate of wear of rail for different sizes. With the multiplicity of variation in form of worn wheel treads passing over rails of different sizes and ages, an answer to such questions can hardly be expected. Some of the efforts to evaluate the reduction in tractive resistance and the lessened cost of maintenance with increase in rail section are not convincing.

And yet heavy rail must present an advantage to both track and rolling stock. One gain not often mentioned is that added stiffness gives greater ability to carry loads over short soft spots without undue deflection or permanent bending of the rail, places where the weakness in the substructure may not be apparent. Heavier rail will better resist without so much permanent deformation the lateral impacts and those extra loads and blows that come rather frequently from poorly designed or poorly maintained rolling stock, perhaps of unknown or accidental character. Much of the advantage of heavy rail must be based on a number of such resistances and safeguards.

Heavy rail is not a panacea for inadequate substructure. To obtain the full gain from an investment in heavy rail, the rail support must be correspondingly substantial—closely spaced solid ties, full ballasted and well maintained substructure. The same care, too, must be taken to secure uniform smoothness and stiffness along the length of the track.

How to evaluate the economy of heavy rail is a baffling question. An attempt to solve it by mathematical methods in the present state of our knowledge involves assumptions and uncertainties and deficiencies in knowledge. Especially must there be difficulties and uncertainties in making a choice of coefficients to translate it into reliable money estimates. A conclusion based on mathematical assumptions (direct or implied) is likely to carry with it implications of certainty not warranted by the nature of the available data or by the accuracy of the assumptions. It can hardly be said to be something on which a heavy investment may be based with any confidence. Definite experience and observation on the results obtained with increased size of rail, both with and without an accompanying improvement in substructure, are greatly needed.



Using a Thermocouple and a Potentiometer to Measure Rail Temperatures on Continuously Welded Rail

With only the information available at the present time, it may be better to rely on the direct judgment of an experienced man who can sense needs of the situation.

Smoothness vs. Variability of Surface

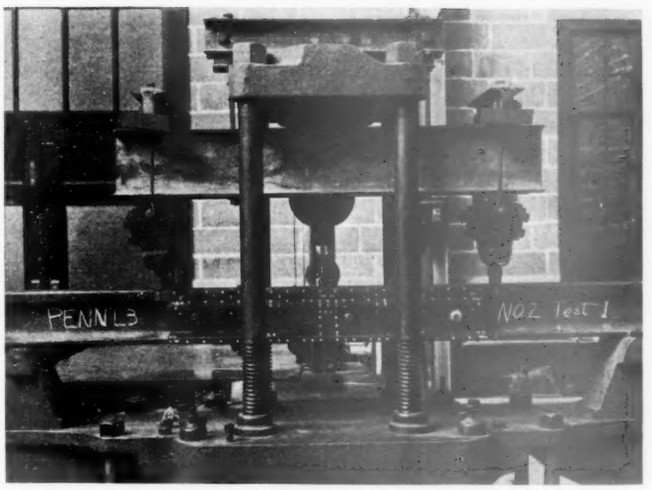
In maintenance work the trackman leaves the surface and line in excellent appearance. I have full admiration for the work of the trackman; he does a good job so far as he can see, but he can not see the condition between rail and tie or under the ties. Unfortunately, what seems a perfect surface in an unloaded state may in the loaded state be made up of uneven supports, reacting variably, so that the effect is that of ups and downs from tie to tie while the train loads are applied. The action of traffic may soon give permanent depression to the poorly supported ties. Under repeated application of the loads of locomotives and cars the depression of the rail becomes irregular from tie to tie. Even seemingly small variations in the adzing of a tie will easily give a twist to the rail and change the position of the application of the reaction between rail and tie. The consequence is that the load taken by adjacent ties

Test Party Preparing Stremmatographs to Measure Rail Stresses in a Test Run

as the wheel moves along, especially with a heavy rail, may vary from zero to two or three times the average tie load; the track is in effect made up of relatively soft and hard spots; instead of being smooth, the track supports may be relatively rough; unduly high and unexpected stresses are applied to rail, tie and ballast; maintenance damage is increased by both the excessive vertical loads and the lateral loads thereby applied.

Further, and this is important for high speeds, the variability in the supports is not only from tie to tie—it occurs from spot to spot a few feet or a hundred feet apart. A track that may serve for freight trains at 30 m.p.h. will be unsatisfactory at 60 m.p.h. and more so for a passenger train at 90 m.p.h. or faster. The movements of car springs and car bodies at high speeds will necessarily catch the variations in track at longer distances apart, and uniformity of surface over longer stretches becomes increasingly essential to smooth action as speed increases. It is obvious that the higher the speed the greater the disadvantages caused by variability from one point in track to another.

It should be added that these undesirable variations in track surface when loaded are relatively greater for stiff rail-support than for the less stiff support found in



Laboratory Set-Up to Find Stresses in Various Parts of Rails and Joint Bars Under Various Loads

less stiffly ballaster track. A variation from point to point of 0.10 in. is far more damaging with an average rail depression under load of 0.10 in. than when the average rail depression under the same load is 0.25 in. In other words, on stiffly supported track (that built for heavy and fast traffic) the effect of variation in stiffness and in variable play between rail and tie bed is very large. This means that even greater care to secure uniform support and to avoid the variabilities found by the tests should be used in the maintenance work on heavy traffic track.

Let me express the view then that one of the findings of the tests is that the appearance of the rail surface in an unloaded state is far from being an indication of the uniformity and smoothness of the supporting structure while loaded and that this unseen variability is an unsuspected source of the lack of smoothness in track. One of the great needs is an improvement in the work of tamping track to insure better uniformity and smoothness of rail support over greater distances. The man who will devise a ready way of measuring track stiffness and its variability and of regulating the tamping well toward uniformity will make a real contribution to track excellence. With machine tamping, there is no indication that uniformity has been much improved. I want to suggest that track engineers should bend their efforts to securing an improvement in uniformity of rail support. The heavier the rail and the stiffer the substructure the greater the need. Success will be worth the effort. Perfection can not be expected but improvement is possible. And after all, careful and adequate maintenance work remains a desideratum in the upkeep of track.

At the risk of some repetition, let me say that the use of stiffer substructure (ties, ballast and roadbed) built for the purpose of carrying heavy traffic a longer time without extensive maintenance charges carries with it to the management the obligation to construct and maintain a uniformly smooth track (smooth while loaded), free from the variabilities heretofore referred to. This requirement is needed to ensure moderation in train equipment maintenance and smoothness of train operation, as well as to ensure a lessening in track maintenance.

The tests and studies made on the rail-joint problem have produced valuable results. Among the advantages found may be mentioned that accruing to the joint through having an increase in the fishing height of the joint bar made available with the newer rail sections. For the heavier rail sections the shape known as the symmetrical bar or near-symmetrical bar has been shown

to have substantial advantages over the angle bar type, though for the lighter rails the advantage is not so marked, but for these lighter rails the information obtained has resulted in a much better design of the angle bar. A moderate bolt tension of 8,000 to 15,000 lb. is considered much better than a higher tension. A still lower bolt tension is not particularly objectionable in a well-fitting symmetrical bar, though it does reduce the effectiveness of the angle bar materially. Excellence of fit between bar and rail (very close fit) is essential to proper joint action, resulting in smaller deflection, larger participation in carrying bending moment, smaller wear, and generally in lessened rail batter.

Continuous Welding of Rail

The several stretches of track under observation on the Delaware & Hudson at Albany, N. Y., and Schenectady and Mechanicville which have the rail ends welded to a continuous length of ½ mile to 1½ miles and the mile stretch of the Bessemer & Lake Erie at Pittsburgh, Pa., have now passed through two to four winter seasons with apparently satisfactory results. The staff of the Track Stress investigation has made observations and measurements in warm and cold weather to determine the temperature stresses developed along the length of stretches and the nature and extent of the rail anchorage developed at the end portions of the welded stretches.

Track Curvature

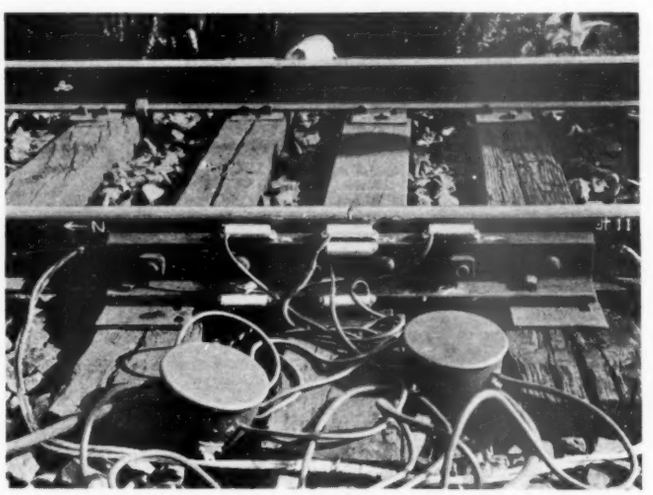
Curvature in alinement has always had its difficulties. The change in direction of a locomotive as it goes around a curve, the pressure and wear on the outer rail to actuate this turning, and the reverse pressure on the inner rail at the pivoting point at or near one of the intermediate drivers act to put large strains and stresses in the rail, those caused by heavy locomotives having been found to be as great at 60,000 lb. per sq. in., and doubtless there are correspondingly large stresses developed in the locomotive. By reason of limitations on the amount of super-elevation permissible, even the lighter curves may limit modern high train speeds (both passenger and freight), though of course it is true that a speed somewhat higher than the normal speed for the superelevation used will give smoother motion for the faster trains, especially if suitable spirals are used to change from tangent to curve and back again. The introduction of high speeds makes it extremely desirable to extend our knowledge of the relation between track and rolling stock for the benefit of the equipment, track maintenance, and train operation.

Locomotive Counterbalance

Improper locomotive counterbalance has long been a source of injury to track. The tests of the Track Stress investigation and those of other agencies have uncovered many instances of seriously faulty counterbalance (either by oversight or ignorance in design or unauthorized changes made in repair shops), which have caused serious destructive damage to rail and other parts of track. Increased weight of driving parts and the seeming need for larger dimensions which have increased the out-of-plane distances between rail and moving parts, together with large increases in operating speeds have made the counterbalance problem a most important one, especially when locomotives have been used at speeds well beyond those for which they were designed. Buying heavier rail does not seem a satisfactory solution for such ills. Fortunately, improvements in design, high-strength materials, larger driving wheels and better opportunity for placing counter-weights, lessened allowance for reciprocating parts and adequate cross balancing have made it possible to equip locomotives with counterbalance that will apply only a reasonable increase in load on the rail, even at the higher operating speeds. The advantages gained extend also to the maintenance of the locomotive itself.

Lateral Oscillation

But the out-of-balance of rotating and reciprocating parts is not the only source in increasing the load on rail at the higher speeds. Electric locomotives as well as steam locomotives are subject to transverse oscillatory or vibratory movements, front and back (the periodicity of the vibration depending upon the dimensions and design or the locomotive and not upon speed). This pendulum-like oscillation may be started by roughnesses in the track (slight roughness or variability if the speed is high), by going on or coming from a curve, or by some action of the locomotive itself. It is well established that a transverse or lateral pressure of a wheel on a rail results in an increase in vertical pressure or load applied to a rail by one wheel and in a decrease in the load applied by the other wheel on the same axle. Lateral pressures on the rail observed in tests, due to these oscillations on straight track, have been extremely large, almost unbelievably great, high enough to move highest-grade track laterally well out of line. Corresponding transfers of vertical loads from one wheel to the other wheel of the same axle may likewise greatly increase the vertical load applied to one rail. Such an extreme case is cited to show difficulties that arise in the use of very high speeds.



Six Magnetic Strain Gages to Find Stresses in Joint Bars at Speeds Up to 90 Miles Per Hour

Conditions of Rolling Stock

Then there are many mooted questions about rolling stock in general—its design, its upkeep, its liability to get out of order. Why do individual wheels of heavily loaded freight cars in ordinary service sometimes show rail stresses equivalent to those of a wheel load of 60,000 lb. when another wheel of the same car gives corresponding wheel loads of 25,000 lb. at the same point in the track, as has been found by the test party of the Rails

investigation on regular trains passing over ordinarily good track. What is the cause of such excessive loads? Again, is the standard coning of wheels conducive to unnecessarily large lateral motion, the wheel flanges first bumping against one rail and then the other, and how does the variably worn wheel tread influence this back and forth motion, either at low speeds or at high? Without going over the whole field, does it not seem evident that there are many questions needing answers that affect the influence of the design and condition of the rolling stock on the upkeep of the track, as well as questions on the effect of the construction and upkeep of track on the design and operation of the rolling stock? Unquestionably there are interrelations between track and rolling stock that merit adequate investigation.

The matter of an investigation on the relation between locomotive and cars and the track and bridges is not a new question. Two of the later efforts may be referred to. In 1931 and again in 1934, acting on suggestions made by officials of the American Railway Association, a conference committee composed of representatives of the Committee of Stresses in Railroad Track of the A.R.E.A. and the Committee on Locomotive Construction of the Mechanical division discussed the needs and advantages of such an investigation.

Quoting in part from the second conference report, "It has become evident to those engaged in the design and operation of railroad rolling stock and the construction and maintenance of track and bridges that there is great need of a thorough experimental investigation on the mutual or interacting causes and effects between the rolling stock and track, which would be expected to establish basic principles and obtain pertinent data on standard track with various forms of rolling stock and which would lead the way to improvements in rolling stock and track and to remedying existing conditions now not fully satisfactory. Further, it is believed that the two instrumentalities (the rolling stock and the track) should be kept in mind and hence that the investigation should be conducted jointly by representatives of the Engineering division and the Mechanical division."

Topics named included counterbalance, matters of wheel loads and wheel spacing, oscillating characteristics of locomotives and cars, wear of wheels, characteristics of springs and their relation to track and rolling stock, distribution of load among wheels, prevention of excess load on individual wheels, and periodic vibration of cars, all having a relation both to the track and to the car or locomotive. Reference was made to the bridge engineers who have been urging the need for information on the characteristics of modern American locomotives on bridges of different lengths and types.

To quote again, "The effort should be made to establish principles and methods on the interrelation of the locomotives and the cars and the track as affecting pressures and stresses in the rail, ties and ballast and bridges and also the reaction effects on the various parts of the locomotive and cars in so far as these affect design, construction and maintenance." Expressing the belief that an investigation would result in information of value to the railroads many times greater than the expenditure involved, the conference committee report outlined methods of conducting the investigation, made a preliminary estimate of the expenditures necessary, and recommended that the American Railway Association be asked to authorize an investigation of the interrelation of rolling stock and track.

I am told that both conference reports were looked upon with favor, but the times were not auspicious for the railroads to go into such an undertaking. Perhaps the time is not yet ripe for making a new effort to start this needed research. However, may we not expect (or at least hope) that in the not too distant future such an important research problem will be undertaken under the support of the Association of American Railroads. And may we not believe that whole-hearted cooperation between the Engineering division and the Mechanical division in both the investigation and the mutual utilization of its fruits in their work will be a great gain for the American railroads.

Freight Claim Payments Increase

A TOTAL of $20,920,487 was paid by railways for loss and damage in 1936, according to reports to the Freight Claim division of the Association of American Railroads by 151 carriers, representing 95 per cent of the United States and 95 per cent of the Canadian mileage. This is an increase of 16.6 per cent over 1935, when the total was $17,946,049. In 1934 the total was $17,034,031. Of the total, loss and damage to carload freight amounted to $16,645,400, and to less than carload freight $4,275,087. Carload loss and damage represents an increase of 17.2 per cent and l.c.l. loss and damage 14.1 per cent over 1935.

Although total payments show an increase in 1936, payments due to certain causes decreased. Theft of entire package decreased 23.1 per cent; theft, other than entire package, 12.3 per cent; error of employee, 1.6 per cent; improper refrigeration or ventilation, 13.8 per cent; and concealed loss, 8.2 per cent. Of the causes showing increases in payments, freezing or heater failure exceeded all others, the increase being 70.5 per cent. This reflects the effect of the exceptionally cold weather prevailing during the winter of 1936. Claims due to train accidents increased 36.7 per cent; those due to defective or unfit equipment, 30.6 per cent; those due to delay, 28.8 per cent; those due to loss of entire package, 26.8 per cent; those due to concealed damage, 25.2 per cent; and those due to fire or marine loss or damage, 22.7 per cent.

Payments according to commodities show that those on fresh vegetables amounted to 16.3 per cent of the total; on manufactures and miscellaneous articles, 15.5 per cent; on live stock, 7.3 per cent; and on fresh fruits except citrus, 6.1 per cent. Carload commodities on which the largest payments were made were fresh vegetables, $3,406,862; manufactures and miscellaneous articles, $1,789,821; live stock, $1,530,263; and fresh fruits except citrus, $1,273,961. Unlocated damage, freezing or heater failure, and delay were the causes of most of the payments on fresh vegetables; unlocated damage, concealed damage and train accidents to those on manufactures and miscellaneous articles; unlocated damage, delay and train accidents to those on live stock; and unlocated damage, delay and freezing or heater failure to those on fresh fruits.

Payments on l.c.l. commodities totaled $1,449,111 on manufactures and miscellaneous articles; $986,174 on new furniture; $354,567 on dry goods, clothing and textiles; and $327,450 on stoves, furnaces, radiators and parts. The major causes for these payments were unlocated damage, unlocated loss, and concealed damage.

Of 2,334,715 claims carried over from the previous year, received from claimants or reopened, 1,944,812 were paid, and 203,059 were declined and withdrawn. Of the claims paid, declined and withdrawn, 77.5 per cent were settled within 30 days.

Price Desk Where Invoice Charges Are Checked and the Revisions in Prices Recorded

Supply Work Highly Organized on Santa Fe

Purchasing procedure designed to avoid mistakes—Contracts and advance prices expedite work

Part II

This article is the second of a series designed to present hitherto unpublished information about the purchasing and stores work of one of the largest buyers of railway materials in the country. Over 1,000 men are employed in the supply organization of the Santa Fe, and over 200,000 requisitions, orders, invoices and vouchers are handled each year by the purchasing department. These and other facts were given in the *Railway Age* of March 27. The record is continued in this issue with a description of the documents used and the methods by which the purchasing procedure is conducted.

ALL requisitions received by the purchasing department are prepared in the store and stationery departments. Store department requisitions originate at 7 of the 55 points where storekeepers are employed and are printed in colors to differentiate between the four grand divisions of the Santa Fe system. On the Atchison lines East, requisitions are prepared at Topeka, Kans., at the Corwith, Ill., reclamation plant, and at Shopton, Ill., using a white form. On the Western lines, they are prepared at Albuquerque, N. M., where a white form is also used. On the Panhandle & Santa Fe, requisitions are prepared at Amarillo, Texas, using a brown form. On the Gulf, Colorado & Santa Fe, they are prepared at Cleburne, Texas, using a blue form. On the Coast lines, they are prepared at San Bernardino, Cal., using a pink form. Requisitions for lumber are prepared on a yellow form.

Stores not authorized to make requisitions on the purchasing department obtain their requirements from or through the stores mentioned, by orders which show the quantities of material on hand and used. The purchase requisitions require no report of quantities on hand or the consumption, except in the case of lumber. Only one class of material is ordered on a requisition, but the classifications into which the Santa Fe stock is divided are limited and the requisitions may be and often are several pages long. Usually only two copies are prepared, the original and an office copy, and individual requisitions may specify several destinations. While all principal distributing stores prepare requisitions on the purchasing department, all requisitions, with the exception of those made on local purchasing agents as outlined in standing instructions, go first to the general store at Topeka where they are checked against records of surplus to eliminate items which can be filled from stock and referred, if necessary, to other departments located at Topeka for approval as to standards. They are then ready for the purchasing department.

Requisitions reaching the purchasing office are immediately stamp-dated, and those for stationery and fuel are referred to the proper subdepartments. The others are brought to the requisition department where they are sorted. The number given each requisition by the maker, the date of the requisition and the date received are then posted in a loose-leaf book. This book segregates the record of requisitions from each store and also those for coal and lumber are segregated, and the book is also progressively marked to show the dates on which any requisitions are reported to other departments of the railroad and the dates of their return, so that at any time a compact and instantaneous means of determining the status of a requisition and its location is available. As soon as the requisition numbers are entered in this book, those for coal and lumber, A.F.E. materials, electrical materials and feed are referred to the respective subdepartments, leaving what are designated as stock C requisitions for disposition by the requisition department.

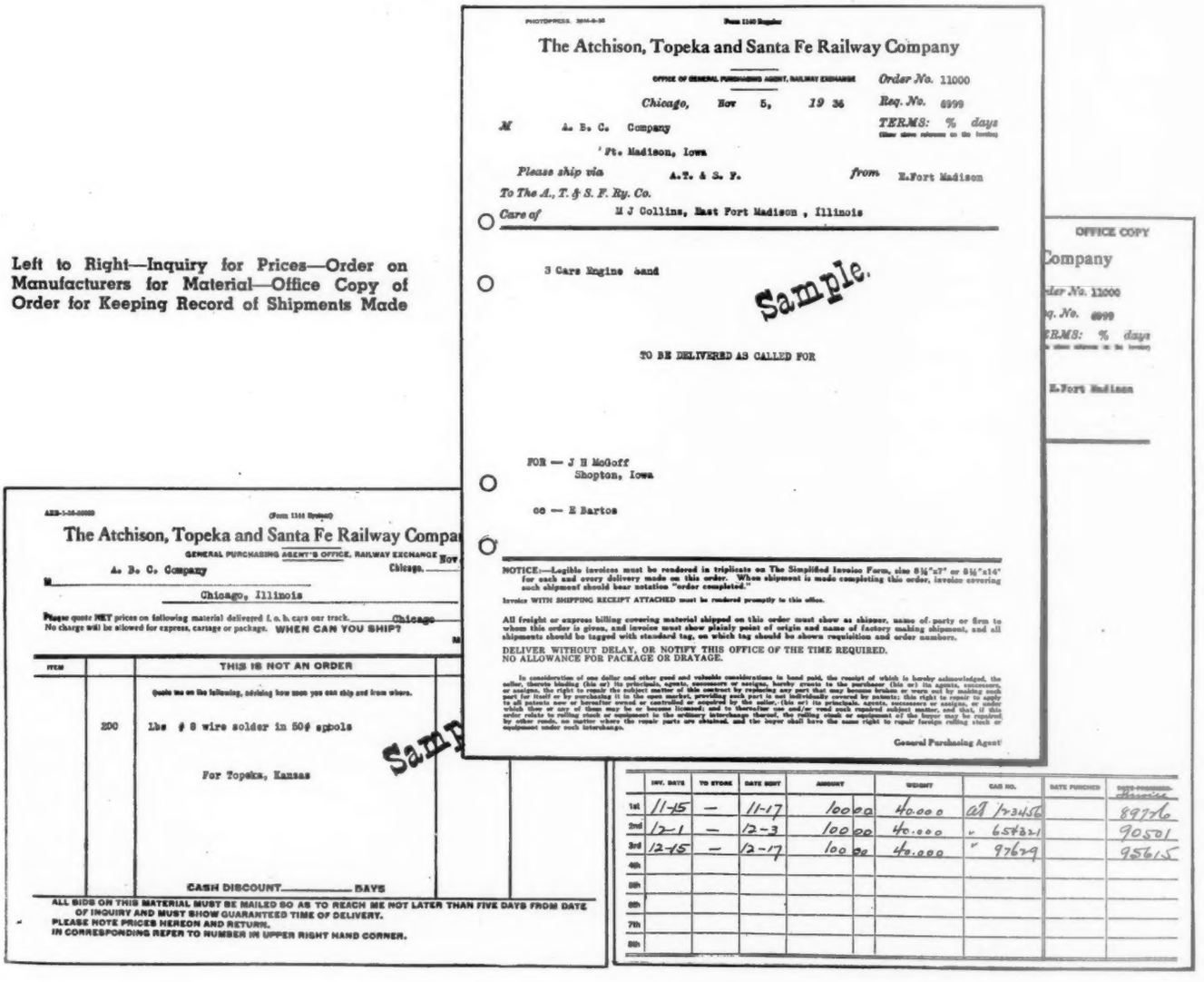
It has long been the policy of the Santa Fe to buy many supplies under contract or agreements with manufacturers. These contracts are made for periods varying from 30 days to 2 years, and practically all contracts are subject to 30- or 90-day cancellation clauses.

The materials included in such contracts and the duration of the agreement in each instance are as follows:

Materials Covered By Term Contracts

Material	Duration of Contract
Acetylene	90-day cancellation
Ammonia, anhydrous	Yearly
Anchors, rail	Yearly
Ash, soda	Yearly
Axles, car and tender	Quarterly
Batteries, new replacements and car lighting	30-day cancellation
Batteries, primary and renewals	Yearly
Batteries, storage, for signal service	30-day cancellation
Beams, brake	30-day cancellation
Bearings, journal	90-day cancellation
Blanks and paper, carbon for train orders	Yearly
Bolts, carriage	Quarterly
Bolts, machine	Quarterly
Boxes, journal	Quarterly
Brake material, air	60-day cancellation
Brick, arch	Monthly
Brooms, GC&SF	Yearly
Brushes, carbon	Quarterly
Bushings, cylinder	Yearly
Carbide	90-day cancellation
Castings, bolsters and side frames	Quarterly
Castings, brass bearings, journal	90-day cancellation
Castings, finishing	Yearly
Castings, grey iron	Yearly
Castings, malleable	Yearly
Castings, steel	Quarterly
Chlorine, liquid	Yearly
Coal	Yearly
Compound and boiler feedwater treatments	Two years
Conduit and parts	30-day cancellation
Couplers	Quarterly
Disinfectants	Yearly
Dusters, feather	Yearly
Ends, steel, for box, gondola and furniture cars	60-day cancellation
Etchings, zinc for printing blotters	Yearly
Forgings, locomotive	Quarterly
Gates	Yearly
Gravel	30-day cancellation
Headlight equipment	Yearly
Ice	Yearly
Injectors and lubricators	Yearly
Iron, enginebolt and staybolt	Quarterly
Jacks	30-day cancellation
Joints, compromise	Yearly
Joints, rail	Yearly
Lagging, magnesia boiler	Yearly
Lamps, large incandescent	Yearly
Lamps, miniature incandescent	Yearly
Laundry	Yearly
Lubricators, injectors, for locomotives	Yearly
Mimeographs and supplies	Yearly
Nuts, hot pressed	Quarterly
Oil, fuel	Yearly
Oxygen	90-day cancellation
Plugs, washout	Yearly
Printing	Yearly
Rail	Yearly
Ringers, bell, and locomotive sanders	Six months
Rings, packing	Yearly
Rivets, steel draw bar	Quarterly
Rock, crushed	90-day cancellation
Roofs, car, metal	Six-month cancellation
Sand	Yearly
Screws, lag	Quarterly
Seals, tyden car	60-day cancellation
Shoes, brake	60-day cancellation
Signals, interlocking, electric	90-day cancellation
Signal material	30-day cancellation
Soap, liquid	Yearly
Springs	Quarterly
Staybolts and parts	90-day cancellation
Steel, flange and firebox	Quarterly
Steel, high-speed and carbon tool	Quarterly
Stone, crushed	Yearly
Tanks	Yearly
Tires, steel	Quarterly
Tubing mechanical seamless	Quarterly
Varnishes and surfacers	Yearly
Washers, spring	Yearly
Washers, wrot	Quarterly
Welding apparatus	90-day cancellation
Wheels, cast iron, car	30-day cancellation
Wire products	Quarterly
Wire nails	Quarterly

If all or a part of a requisition describes materials which are purchased under existing contracts, inquiries


The Atchison, Topeka and Santa Fe Railway Company
OFFICE OF GENERAL PURCHASING AGENT, RAILWAY EXCHANGE
Chicago, Nov 5, 19 36
Order No. 11000
Req. No. 6999
TERMS: % days
M A. B. C. Company
Ft. Madison, Iowa
Please ship via A.T. & S. F. from E.Fort Madison
To The A., T. & S. F. Ry. Co.
Care of M J Collins, East Fort Madison, Illinois
3 Cars Engine Sand
Sample.
TO BE DELIVERED AS CALLED FOR
FOR — J H McGoff
Shopton, Iowa
cc — E Bartos
NOTICE.—Legible invoices must be rendered in triplicate on The Simplified Invoice Form, size 8½"x7" or 8½"x14" for each and every delivery made on this order. When shipment is made completing this order, invoice covering such shipment should bear notation "order completed."
Invoice WITH SHIPPING RECEIPT ATTACHED must be rendered promptly to this office.
All freight or express billing covering material shipped on this order must show as shipper, name of party or firm to whom this order is given, and invoice must show plainly point of origin and name of factory making shipment, and all shipments should be tagged with stenciled tag, on which tag should be shown requisition and order numbers.
DELIVER WITHOUT DELAY, OR NOTIFY THIS OFFICE OF THE TIME REQUIRED.
NO ALLOWANCE FOR PACKAGE OR DRAYAGE.
General Purchasing Agent
OFFICE COPY
Company
E.Fort Madison
The Atchison, Topeka and Santa Fe Railway Compa
GENERAL PURCHASING AGENT'S OFFICE, RAILWAY EXCHANGE
A. B. C. Company
Chicago, Illinois
Please quote NET prices on following material delivered f. o. b. cars our track, Chicago
No charge will be allowed for express, cartage or package. WHEN CAN YOU SHIP?
THIS IS NOT AN ORDER
Quote us on the following, advising how soon you can ship and from where.
200 Lbs # 8 wire solder in 50¢ spools
For Topeka, Kansas
CASH DISCOUNT DAYS
ALL BIDS ON THIS MATERIAL MUST BE MAILED SO AS TO REACH ME NOT LATER THAN FIVE DAYS FROM DATE OF INQUIRY AND MUST SHOW GUARANTEED TIME OF DELIVERY.
PLEASE NOTE PRICES HEREON AND RETURN.
IN CORRESPONDING REFER TO NUMBER IN UPPER RIGHT HAND CORNER.
INV. DATE
TO STORE
DATE SENT
AMOUNT
WEIGHT
CAR NO.
DATE PUNCHED
1st 11-15 — 11-17 100 00 40.000 A 173456 89776
2nd 12-1 — 12-3 100 00 40.000 " 654321 90501
3rd 12-15 — 12-17 100 00 40.000 " 97679 95615
4th
5th
6th
7th
8th

Left to Right—Inquiry for Prices—Order on Manufacturers for Material—Office Copy of Order for Keeping Record of Shipments Made

for bids for those materials need not be obtained and preparations are made for purchasing by simply initialing the firm names on the requisition.

Advance Prices

It has also been the policy of long standing on the Santa Fe to obtain competitive prices each month on approximately 500 items of material which are not embraced in term contracts but are items in common use. These items are divided into about 46 classes and the prices are obtained by sending out a standard form, listing the items in each class. A prescribed date is set for the return of these prices, which are then tabulated and the successful bidders designated in the tabulation, for reference whenever requisitions are received for the materials in question. This also eliminates the need of sending out an inquiry after requisitions are received. The classes of materials for which competitive prices are obtained monthly are as follows:

Material for Which Competitive Prices Are Obtained in Advance of Requisitions

Acids
Alcohol
Bits, car and machine
Blocks and hoists
Bolts, stove
Bronze mixture and leaf
Chain
Chalk
Chloride, calcium
Cloth, wire
Colors
Cord and twine
Cotters, brads and screws
Drills, carbon
Drugs
Duck and awning stripes
Files
Glass
Handles
Hardware, general
Hinges and hasps
Holders, tool
Hose
Injectors
Ladders, step and extension
Leather
Lead, white and red
Locks
Lye
Nipples, pipe
Pipe fittings
Pipe, sewer, and tile
Polishes
Screws, plates and chucks
Rivet sets
Rivets, tinners
Screws, machine
Shafting, steel
Shellac
Soda, caustic
Stocks and dies
Tacks and brads
Tapes, measuring
Wire, annealed, etc.
Wrenches, pipe, and cutters

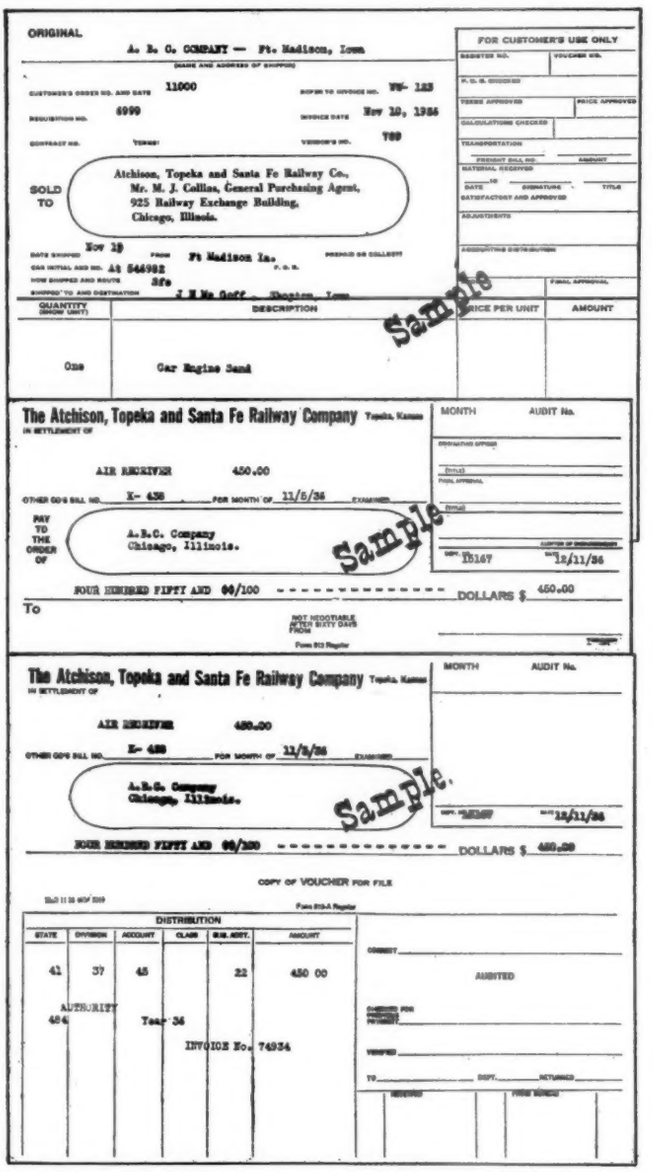
If all or part of a requisition calls for competitive prices not covered by advance agreement or advance prices, the requisition is marked with instructions to obtain bids before purchasing. In connection with some materials where the number of bidders is large, for example, signal and electrical material, the requisitions are usually marked only with the number of the page of the book in which the qualified bidders are listed.

Some requisitions are referred to the mechanical or engineering department or to the system reclamation plant before orders are placed for the material. If a requisition is devoted entirely to such materials, it leaves the office as soon as it is registered out. Otherwise, it remains in the office until all work in ordering other items of material is set in motion. Requisitions calling for rush shipments of materials are segregated as they are received in the requisition department and red tags attached, which remain with the requisitions until the orders are filled.

Requisitions for materials on which competitive prices must be obtained are referred at once to an inquiry desk in the order department, and inquiries are addressed to dealers shown in the company's list of bidders. These inquiries are made in duplicate, an original for the bidder and a copy for the office, and carry the requisition number. The destination of the material is not shown. Net prices f.o.b. tracks are requested, also the shipping point, the guaranteed time of delivery and the discount allowed for cash, and the return of the bid within five days is demanded. When the bids are returned, they are tabulated and the successful bidder or bidders selected and marked on the requisition. The tabulation sheet is then placed in a separate file.

How Orders are Prepared

Requisitions requiring no preliminary or further work are referred to the order department for the preparation of purchase orders. Letter-size forms are used in colors corresponding with the requisitions to differentiate between the materials purchased for the different properties. Each order carries the requisition number and


ORIGINAL

A. B. C. COMPANY — Ft. Madison, Iowa

11000 — 6999 — Nov 29, 1936 — 789

SOLD TO: Atchison, Topeka and Santa Fe Railway Co., Mr. M. J. Collins, General Purchasing Agent, 925 Railway Exchange Building, Chicago, Illinois.

Nov 29 — Ft Madison Ia. — At 544982 — Sfe

FOR CUSTOMER'S USE ONLY

QUANTITY | DESCRIPTION | PRICE PER UNIT | AMOUNT

One — Car Engine Sand

Sample

The Atchison, Topeka and Santa Fe Railway Company — MONTH — AUDIT No.

AIR RECEIVER 450.00

OTHER GO'S BILL NO. K- 438 FOR MONTH OF 11/6/36

PAY TO THE ORDER OF: A.B.C. Company, Chicago, Illinois.

Sample

FOUR HUNDRED FIFTY AND 00/100 ---------- DOLLARS $ 450.00

To

NOT NEGOTIABLE AFTER SIXTY DAYS FROM

The Atchison, Topeka and Santa Fe Railway Company — MONTH — AUDIT No.

AIR RECEIVER 450.00

OTHER GO'S BILL NO. K- 438 FOR MONTH OF 11/6/36

A.B.C. Company, Chicago, Illinois.

Sample

FOUR HUNDRED FIFTY AND 00/100 ---------- DOLLARS $ 450.00

COPY OF VOUCHER FOR FILE

DISTRIBUTION					
STATE	DIVISION	ACCOUNT	CLASS	SUB. ACCT.	AMOUNT
41	37	45		22	450 00

AUTHORITY 484 Year 36

INVOICE No. 74934

AUDITED

Top to Bottom—Invoice Used by All Shippers Rendering Bills for Materials Purchased from Them—Voucher Made by Railroad to Pay for Materials Received — Copy of Voucher for Accounting and Auditing Records

also a purchase order number and is usually made only in duplicate, an original for the seller and an office copy. The color of the office copy corresponds with the color of the original; but in place of instructions to sellers, printed on the lower third of the original, the office copy is ruled with lines for an invoice record of the date of each invoice, the date referred to the receiving store, and the amount and car number. Additional copies are prepared in making orders for materials subject to inspection and test, for signal materials and also for

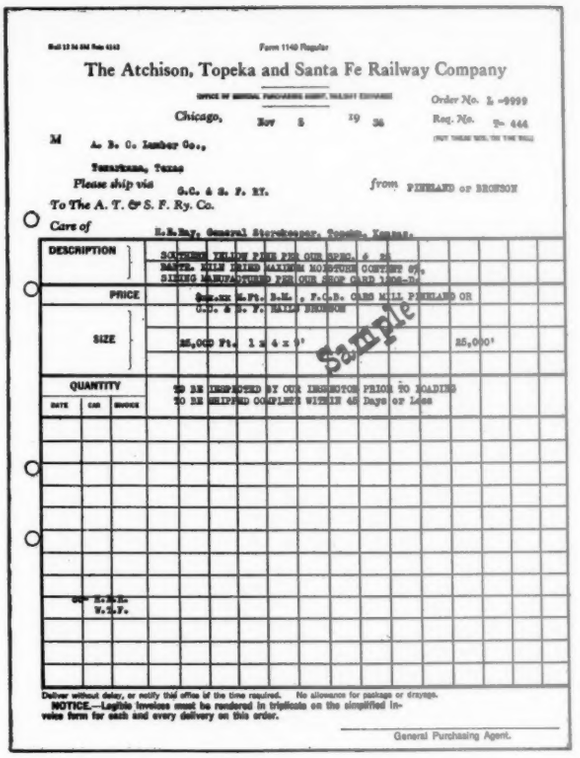
cement and those other materials which are purchased with so-called release orders, specifying shipment to be made only as called for by consignee. These copies are all made on blank paper.

After the regular purchase orders are made, the requisitions are filed in a set of loose-leaf binders and the copies of purchase orders are filed in another binder, each record separating the documents for each railroad. Here they remain for reference when consignees are tracing for material and for use in checking invoices and shipments. When all shipments are made, the papers are stored. Purchase orders not completely filled are recorded in an X file and their status reviewed periodically.

Handling Invoices

All invoices are received from supply firms in triplicate, one copy for the purchasing department, another for the store department, and a third for the auditing department. When they arrive, they are referred to the voucher and invoice department. Invoices allowing a cash discount for prompt payment are singled out and checked against the office copy of the purchase order to verify the quantities, the unit prices, the freight rate and the discount. Vouchers are then made by the voucher department and the voucher placed with the treasurer for payment. The invoice and a non-negotiable copy of the voucher are then forwarded to the general storekeeper. When the receipt of the material is verified, the general storekeeper sends the invoice and the copy of the voucher to the auditor's office.

Invoices not authorizing cash discounts are also vouchered in this department, but the vouchers are not prepared until the receipt of the material by the store department has been verified. The original and all copies of invoices are first sorted according to firm name and are machine-numbered. They are then entered in an invoice register under the proper firm name. The complete record of an invoice in this register is prepared by making the proper entries at each stage of invoice handling and gives the name of the firm, the number and date of the invoice, the amount of the bill as originally rendered, the corrected amount if any, the order number, the date when the invoice was received, the date when the invoice was sent to the store department, the date of its return, and the number, date and amount of the voucher. Each invoice is matched against the office copy of the purchase order to verify the quantity ordered, and a record is made on the order showing the date of invoice, the date sent to the store department and the amount and the car number of the shipment. The invoices are also matched against standing price records, and any missing information is added with a rubber stamp for the attention of the store. When the invoice is returned to the purchasing department with the proper verification of the receipt of the material and inspection, if any, and the store department's verification of the extensions, the invoice department prepares a voucher which is then sent to the auditor with the invoice attached for audit before being referred to the treasurer.



Form 1140 Regular

The Atchison, Topeka and Santa Fe Railway Company

Chicago, Nov 5 19 36 Order No. L -9999 Req. No. P- 444

M A. B. C. Lumber Co.,
Texarkana, Texas

Please ship via G.C. & S. F. Ry. from PINELAND or BRONSON

To The A. T. & S. F. Ry. Co.

Care of H.E.Ray, General Storekeeper, Topeka, Kansas.

DESCRIPTION	SATISFACTORY YELLOW PINE FOR OUR REPRO. & 20 PARTS. MILL DRIED MAXIMUM MOISTURE CONTENT 6% SIZING MANUFACTURED FOR OUR SHOP CARD 1206-Z
PRICE	Spec.No. M.Ft. B.M. , F.O.B. CARS MILL PINELAND OR U.S. & S. Y. RAILS BRONSON
SIZE	25,000 Ft. 1 x 4 x 9' 25,000'
QUANTITY	TO BE INSPECTED BY OUR INSPECTOR PRIOR TO LOADING TO BE SHIPPED COMPLETE WITHIN 45 Days or Less
DATE / CAR / INVOICE	

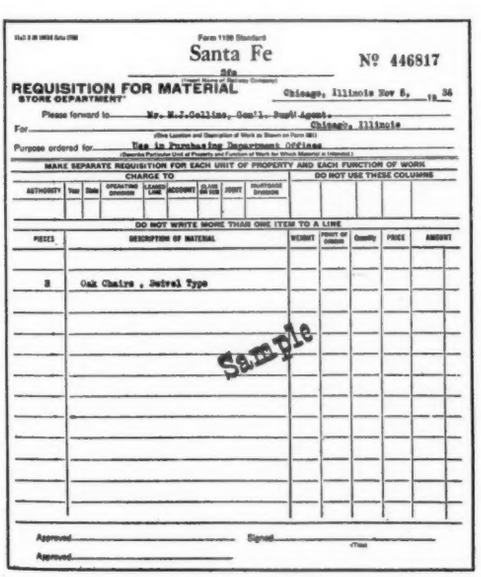
Sample

Deliver without delay, or notify this office if the time required. No allowance for package or drayage.

NOTICE.—Legible invoices must be rendered in triplicate on the simplified invoice form for each and every delivery on this order.

General Purchasing Agent.

Special Requisition Used for Ordering Lumber



Form 1120 Standard

Santa Fe

№ 446817

REQUISITION FOR MATERIAL
STORE DEPARTMENT

Chicago, Illinois Nov 5, 1936

Please forward to Mr. M.J.Collins, Gen'l. Purch. Agent.

For Chicago, Illinois

Purpose ordered for Use in Purchasing Department, Offices

MAKE SEPARATE REQUISITION FOR EACH UNIT OF PROPERTY AND EACH FUNCTION OF WORK

CHARGE TO — DO NOT USE THESE COLUMNS

AUTHORITY	Year	Class	OPERATING DIVISION	CLASSIFICATION LINE	ACCOUNT	CLASS OR SUB-ACCT.	JOINT	SUBSTRUCTURE DIVISION

DO NOT WRITE MORE THAN ONE ITEM TO A LINE

PIECES	DESCRIPTION OF MATERIAL	WEIGHT	POINT OF ORIGIN	Quantity	PRICE	AMOUNT
2	Oak Chairs , Swivel Type					

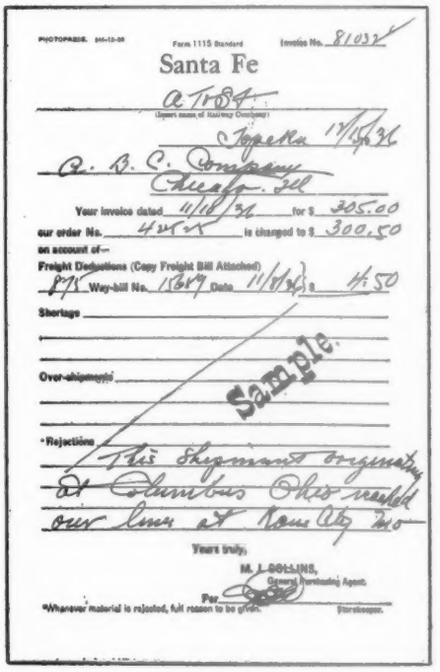
Sample

Approved Signed

Approved

Left—Order on Stores by Purchasing or Other Departments for Special Material

Right—Notice to Shippers of Deductions Made for Freight Charges



PHOTOPRINT. 500-12-36 Form 1115 Standard Invoice No. 81032

Santa Fe

A T&SF
(Insert name of Railway Company)

Topeka 11/5/36

A. B. C. Company
Chicago, Ill.

Your invoice dated 11/4/36 for $ 305.00

our order No. 4444 is changed to $ 300.50

on account of—

Freight Deductions (Copy Freight Bill Attached)

Way-bill No. 1617 Date 11/4/36 4.50

Shortage

Over-shipments

Sample

*Rejections This Shipment originated at Columbus Ohio routed over lines at Kansas City Mo

Yours truly,

M. J. COLLINS,
General Purchasing Agent.

Per

*Whenever material is rejected, full reason to be given. Storekeeper.

These vouchers often cover the payment of several invoices.

As will appear from the foregoing, the invoice department handles all the order work from the time it reaches the merchant until the shipment is received, checked against the order, verified as to price and sent to the storekeeper for a verification of the material, and then returned by him for voucher. The department thus has the complete and detailed record of every transaction and first-hand information regarding miscellaneous items, as well as new equipment, lumber, coal, oil, and stationery.

The invoice and voucher record enables the department to give immediate information on the status of the account with every firm. This is often required by the treasurer or by supply firms. The record reflects the amount of business transacted with each concern over any period of time, and affords other information that is often necessary in handling correspondence. The department can quickly trace every item included in the sellers' statements of account and can keep a close check of any delayed payments, since the invoice register is checked each month for invoices outstanding 60 days or more. The department is frequently called upon to furnish quick information regarding the vouchers which have been passed, covering payments for equipment, new power, coal and oil, and to furnish the treasurer with a record of the vouchers that can be anticipated. The invoice register is kept posted up to date so that the department can also state when purchases from a concern approach or pass the $50,000 mark, to be used in reporting purchases made under the Clayton Act.

(To be concluded in a later issue)

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended March 20 totaled 759,269 cars, an increase of 10,276 cars or 1.4 per cent above the preceding week, an increase of 190,418 cars or 33.5 per cent above the corresponding week in 1936 when freight traffic was reduced by floods in the East and dust storms in the West, and an increase of 152,091 cars or 25 per cent above the corresponding week in 1935. All commodity classifications except forest products showed increases over the preceding week, and all commodity classifications except grain and live stock showed increases over last year. The summary, as compiled by the Car Service Division, Association of American Railroads, follows:

Revenue Freight Car Loading

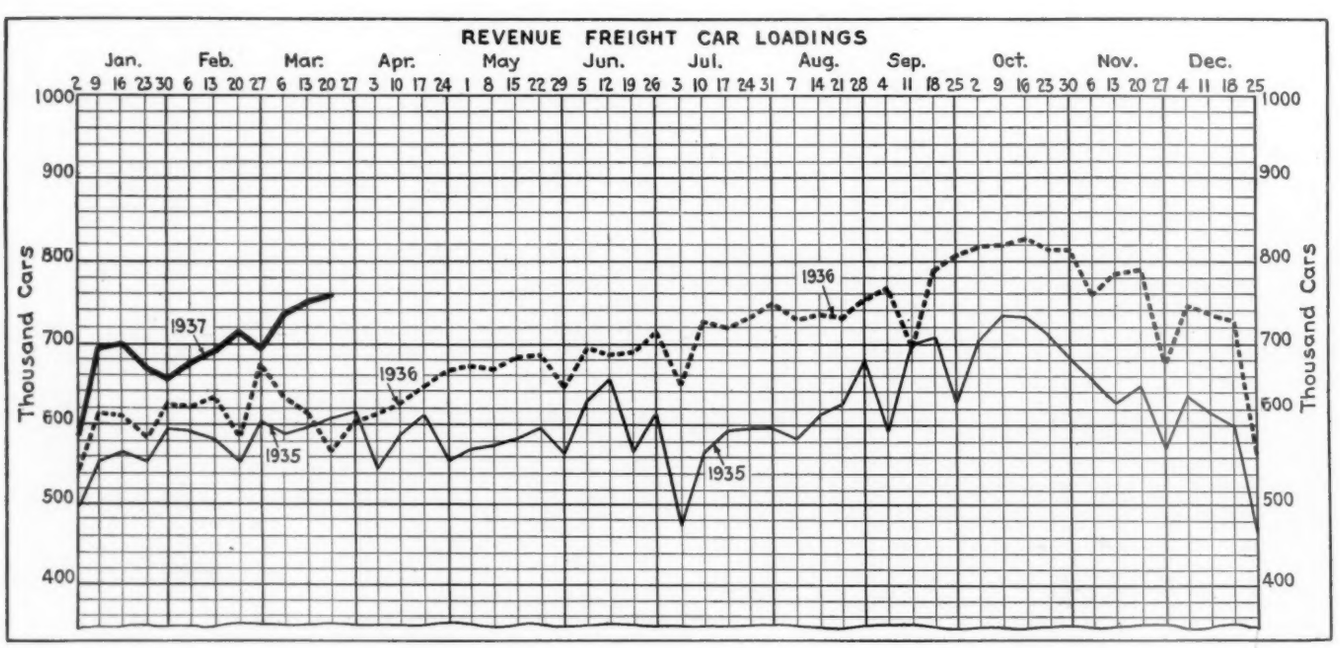
For Week Ended Saturday, March 20

Districts	1937	1936	1935
Eastern	174,044	123,420	137,995
Allegheny	160,674	94,187	124,453
Pocahontas	58,933	39,987	49,905
Southern	118,031	92,959	98,098
Northwestern	82,393	74,846	66,749
Central Western	105,741	92,476	83,733
Southwestern	59,453	50,976	46,245
Total Western Districts	247,587	218,298	196,727
Total All Roads	759,269	568,851	607,178
Commodities			
Grain and Grain Products	29,481	32,287	25,859
Live Stock	11,782	12,192	10,682
Coal	172,216	85,627	139,568
Coke	12,059	5,851	5,654
Forest Products	37,387	30,149	26,047
Ore	10,945	5,858	4,647
Merchandise L.C.L.	171,357	146,682	160,471
Miscellaneous	314,042	250,205	234,250
March 20	759,269	568,851	607,178
March 13	748,993	616,937	597,431
March 6	734,127	634,570	587,190
February 27	696,727	672,869	604,331
February 20	714,884	586,487	553,165
Cumulative Total, 12 Weeks	8,337,530	7,307,048	6,888,398

Car Loading in Canada

Car loadings in Canada for the week ended March 20 totaled 48,709, as against 43,823 last year and 47,534 in the previous week, according to the summary of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
March 20, 1937	48,709	29,701
March 13, 1937	47,534	28,693
March 6, 1937	47,345	30,083
March 14, 1936	43,823	23,469
Cumulative Totals for Canada:		
March 20, 1937	514,807	306,329
March 14, 1936	456,150	247,967
March 16, 1935	468,332	248,466



Automatic Heating System for Refrigerator Cars

Safety closed system for cars with ice bunkers maintains even inside car temperatures

A CLOSED heating system circulating diethylene glycol which operates automatically through thermostatic control of a heating element burning liquefied propane gas has been designed by the Safety Car Heating & Lighting Company, New York, N. Y., and has been applied to a number of freight and express refrigerator cars with ice bunkers and Silica Gel iceless refrigerator cars. In well-insulated cars the thermostatic control regulates the system to maintain set inside car temperatures with maximum fluctuations of about 3 deg. F. above or below the set temperature. The results of a test run between Sumner, Wash., and Jersey City, N. J., during which the outside temperature varied from 12 deg. F. below zero to 62 deg. F. above zero, showed that the heating system kept the average inside temperature at 36 deg. F., and that the maximum variation in temperature between the top and the bottom of the car was 3 deg. F. The results of this test are plotted graphically in Fig. 2.

A box containing the heater and its controls is placed outside the car beneath the floor, and the heated diethylene glycol passes from the heater to pipes placed on the car floor under the floor racks. A thermostat bulb placed inside the car operates the controls of the heating element and keeps the burner in operation the proper length of time to maintain the desired temperature. It has been found that well insulated cars can be preheated in less than 24 hr. to a temperature of 40 deg. F. when the outside temperature is 40 deg. F. below zero. The liquefied propane gas is stored beneath the car floor in a tank which in most installations has a capacity of 300 lb.

Diagrams of the system, heating element and controls, and an illustration of an application of the heating element to a Merchants Despatch refrigerator car are shown in the various illustrations. A detailed description of the heating system follows:

The heat is applied to the car by means of radiation from pipe coils *A* located on the floor under the floor racks shown in Fig. 3. The ends of these coils connect, as shown in Fig. 4, to a heating element *B* in the heater assembly forming a closed system which is filled with a solution of diethylene glycol. As heat is applied to the heater element, heating of the solution causes it to circulate in the same manner as in the usual hot-water heating system. The solution lasts indefinitely and new solution is required only to replace any loss due to leakage.

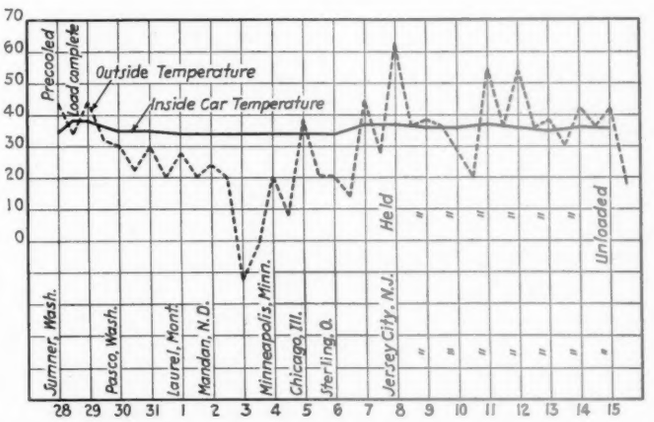


Fig. 2—Record of Inside and Outside Car Temperatures of a Shipment of Hot-House Rhubarb Moving Under Heater Service from Sumner, Wash., to Jersey City, N. J. The Thermostat Setting Was 36 Deg. F., and the Average Temperature Maintained Was 36 Deg. F.

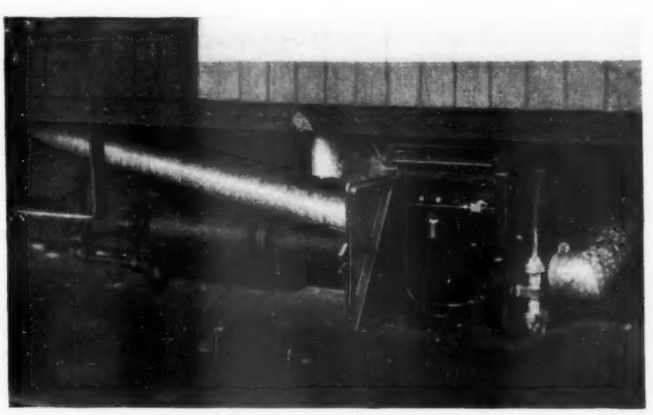


Fig. 1—Safety Heating System Installed on a Merchants Despatch Refrigerator Car

Propane, a liquefied petroleum gas, is used to furnish the heat and is carried in a tank suspended under the car body. This tank has a gage, which indicates the amount of fuel in the tank, and necessary filling and shut-off valves.

Vaporized propane is taken from the top of the tank and piped to the heater at *C* where it enters the liquid trap. This trap serves to retain liquid propane which may find its way to that point and prevent it from entering the pressure regulator. The vapor up to this point is under pressure corresponding to the atmospheric temperature. The pressure regulator reduces this pressure to 13 in. of water and holds it constant at that value for supplying the burner.

A small amount of the low-pressure vapor is fed directly to a small pilot burner which is lighted when the system is put in operation and remains lighted as long as fuel is supplied. The function of this pilot is twofold: First it lights the main burner when gas is supplied to it, and, second, it provides an automatic gas shut-off as described later.

The gas for the main burner passes from the regulator through connection *D* to the pilot safety valve, thence through the thermostatically operated valve *E* and to the burner. The pilot safety valve has a solenoid, the winding of which terminates in a thermocouple so located at *F* as to be heated by the pilot flame. The thermo-elec-

tric current thus generated energizes the solenoid, which acts on an armature attached to the valve, to hold the valve in an open position. If the pilot be extinguished from any cause, the cooling of the thermocouple will de-energize the solenoid and permit a light spring to close the valve, thus shutting off the supply of gas to the main burner. The pilot valve must be manually reset after relighting the pilot by removing cap *G* and lifting pin which opens the valve and brings the armature in contact with the solenoid core.

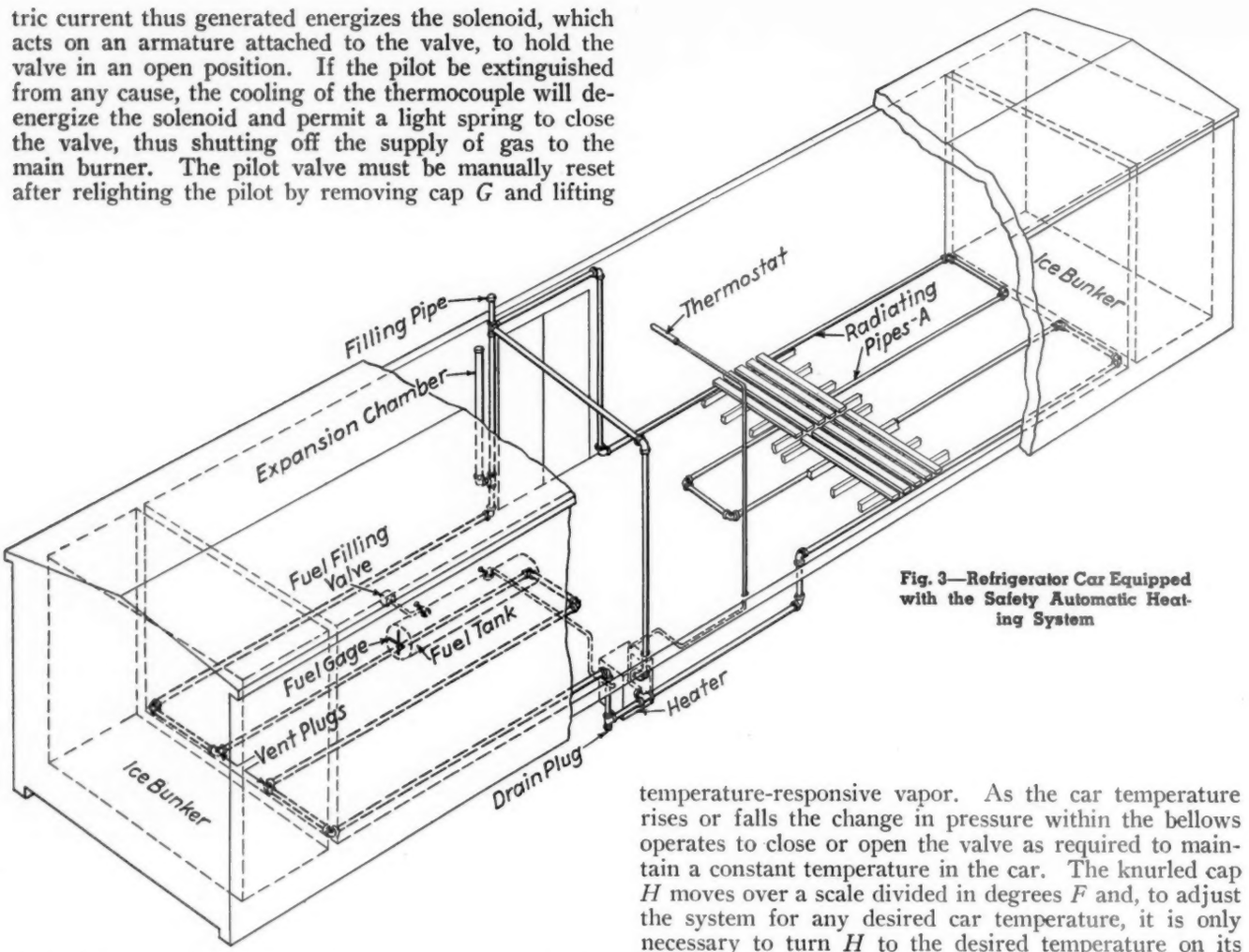


Fig. 3—Refrigerator Car Equipped with the Safety Automatic Heating System

The supply of gas to the burner is controlled by the thermostatic valve *E* which is composed of a snap-action valve actuated by the expansion and contraction of a metal bellows connected by means of a small-bore tube to a bulb located within the car body and filled with a temperature-responsive vapor. As the car temperature rises or falls the change in pressure within the bellows operates to close or open the valve as required to maintain a constant temperature in the car. The knurled cap *H* moves over a scale divided in degrees *F* and, to adjust the system for any desired car temperature, it is only necessary to turn *H* to the desired temperature on its scale.

The heating element consists of an assembly of cast sections similar to the usual hot-water radiator, and has ribbed external surfaces for increased heat transfer. These are enclosed in an insulated casing with openings at the bottom to admit necessary air for combustion and at the top for escape of the products of combustion.

The fuel supply may be carried in a tank permanently attached to the car and refilled from storage tanks established at convenient points, or the car may be equipped with suitable racks for receiving the standard flasks in which propane is shipped, the procedure in this case being to remove flasks as they become empty and replace with full ones.

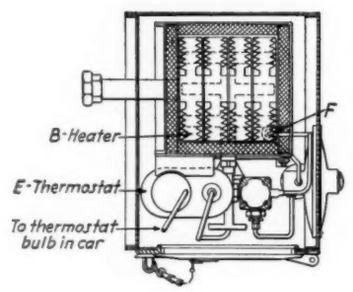
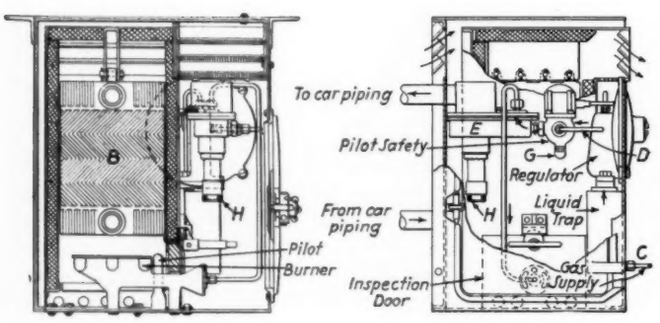


Fig. 4—Heater and Controls for Safety Automatic Heating System



RAILROAD PASSENGERS carried to and from New York City last year increased 14,255,133, or 5.5 per cent, according to the Port of New York Authority. The grand total was 275,087,968, including both commuters and others. The tabulation, which was made in connection with the Port Authority's studies on railroad traffic in the port district, shows that the largest total gain was in the New Jersey sector, the Hudson & Manhattan leading with a gain of 2,483,259, and the Pennsylvania following with 2,301,259. In the Long Island sector, the Long Island figure was 82,278,859, an increase of 4,607,657, or 5.93 per cent. For Westchester, the figure was 46,631,337, a gain of 3,471,082, or 8.04 per cent. A total of 56,331,290 passengers of all classifications passed through the Pennsylvania Station last year, an increase of 6,337,192, or 12.68 per cent. The average daily one-way traffic was 84,479, which was 9,600 more than for the previous year. The Grand Central Terminal was used by 35,726,925, a gain of 3,927,389, or 12.35 per cent.

I.C.C. Celebrates Its Jubilee

First 50 years of famed transport tribunal commemorated by large banquet and a day of speech-making

WASHINGTON, D. C.

THE Interstate Commerce Commission celebrated this week its first 50 years of existence, during which time it has hewn a new path of institutional precedents for the guidance of government in meeting the problems arising out of the complexity of modern industry, and the growing intervention of the political authority in industrial processes. The commemorative exercises, which were sponsored by the Association of Practitioners Before the Interstate Commerce Commission, consisted of a banquet, attended by some 800 guests, at the Mayflower Hotel on the evening of March 31, and by a full day of speeches delivered before an assembly of the Commission's staff and friends in the auditorium of the Commission building on April 1.

At the dinner on March 31, Henry Wolf Bikle, general counsel of the Pennsylvania, was toastmaster, and addresses were delivered by Elmer A. Smith, general attorney, Illinois Central, and Luther M. Walter, general counsel of the National Industrial Traffic League. The commissioners and their wives were guests of honor at this function.

In introducing the discussion at the dinner, Toastmaster Bikle said that in our social life new situations are constantly arising, even as they arise in organic life, and if society cannot develop mechanisms and institutions to deal with these new situations, it will perish, as surely as the organism will which cannot adapt itself to environmental changes. The Interstate Commerce Commission, he maintained, was created to deal with serious disputes which arose with the growing magnitude of transport enterprises; and that its success in dealing with these disputes has made it the prototype of other administrative tribunals which further complexity of our economic life has called into being.

He added, however, that the Commission would have failed to become such a prototype had it not been for the character of men who sat upon it. He ascribed the strength of the Commission to the integrity of the commissioners, to their self restraint in serving only under the law as an arm of Congress, to their wisdom in recognizing their functions as economic and not political, and to their courage in insisting upon their independence of any authority except the law as laid down by Congress.

Mr. Smith in his address pointed out the necessity of administrative tribunals to the orderly conduct of business under modern conditions, and said that the success of such tribunals came largely from the success of the I.C.C. in setting sound precedents for the conduct by such tribunals of their functions. He complimented the Commission for its open-mindedness and impartiality, and the fact that it decides cases on the evidence.

Disputes Which I.C.C. Type Bodies Could Dissolve

He quoted from a number of authorities in the law to show their recognition of the seriousness of certain bases for conflict which have arisen in modern society; and how such conflicts could not possibly be satisfactorily resolved under traditional court procedure or by direct political methods—hence the necessity for administrative law which will preserve the time-honored principles of the common law, with procedural methods adapted to contemporary requirements. The effectiveness of such law, as it has been developed by the I.C.C., he said, is shown by the relatively few cases which are ever taken from the Commission to the courts.

There are, he said in conclusion, other recent controversies which have arisen which are as serious as those which first led to the establishment of the I.C.C., but which have not yet been brought under the jurisdiction of administrative tribunals—which, in the interest of society, they well might be. Relationships between shippers and railroads and among the railroads themselves have been put on a higher ethical plane as a result of I.C.C. activity, and, he insisted, it is the duty of practitioners before that body to do their part to maintain the honorable tradition.

Hits Government Reorganization Scheme

Mr. Walter paid his respects—and they were not lofty—to the plan for reorganizing the independent branches of the government, which would split the Commission and give part of its functions to an administrative department. While expressing high regard for the President, he said he thought it was a mistake to press forward the proposed change; and he cited debates in Congress when the Commission was first established to show that this question had been thoroughly considered and independence for the I.C.C. decided upon as essential half a century ago. He paid tribute to the wisdom of President Cleveland in selecting men of great ability and integrity to the Commission as originally constituted; and in particular to Chairman Cooley who undertook the post at great personal sacrifice, to lay down a foundation of wisdom and integrity upon which the subsequent success of the I.C.C. has been based. He called upon all practitioners before the Commission to rally to a position for the Commission where it will answer only to the law and not to the desires of any individual. The practitioners, he added, should inform Congress of the issues involved, as a duty "to Congress, to the public and to ourselves."

Musical fare at the dinner was provided by the robust voices of the Interstate Male Chorus, with Commissioner Aitchison wielding the baton. Among the selections sung was one (your reporter caught the title as "When Twilight Dues") composed by the distinguished conductor himself. Another selection, the Bandit Song from Ernanie, was especially dedicated to the practitioners.

The program of addresses on April 1 included the following: A presentation on behalf of I.C.C. employees, by George M. Crossland, assistant director, bureau of traffic (and senior employee of the Commission); Practitioners before the Commission, by Allan P. Matthew, president of the Practitioners' Association; The state commissions and the I.C.C., by John E. Benton, general solicitor of the National Association of Railroad and Public Utilities Commissioners. One of the three sessions into which the day's proceedings was divided was taken over by commissioners themselves—

present and past—Commissioner McManamy presiding, and with addresses as follows: The Roots of the Act to Regulate Commerce, by Commissioner Aitchison; The Act Before 1920, by Former Commissioner Farrell; The Act Since 1920, by Former Commissioner Esch. At the closing (evening) session, with Commissioner Meyer presiding, there were presentations on behalf of the House Committee on Interstate Commerce by Chairman Lea and Floor Leader Sam Rayburn, and the Senate Committee by Chairman Burton K. Wheeler; followed by a special message written for the occasion by the President. Presiding officers at the sessions, in addition to those already named, were Commissioners Eastman and Miller.

More Money and Space Needed

Chairman Miller in opening the April 1 sessions drew attention to the recent increase in the Commission's duties, the increase in its staff and consequent lack of space. He also mentioned the inadequacy of funds to carry out the duties imposed upon the Commission, and predicted that, if the water and air carrier bills were passed, the Commission would need nearly double its present personnel and space. The transport industry, he said, was not as prosperous as industry as a whole, and orderly regulation of all agencies by one body should serve to improve their financial status.

Mr. Crossland recited some events in the early history of the Commission, relating how the first members of the body were sworn in on March 31, 1887, having temporary offices on F street, between Fourteenth and Fifteenth streets. The first questions raised for it to decide, he said, were a number of Fourth Section applications. In the first few weeks of the body's history, it had no typists and all records were kept in manuscript. His address contained much detailed information about the growth of employment by the Commission, salaries paid and like data of particular importance to the staff.

The effort and qualities of personality which had to be put forth by the Commissioners in the formative period "to make this law work" constituted the burden of the address by Mr. Matthew.

Tribute by Messrs. Benton and Esch

A survey of state commission history which antedated and has paralleled that of the I.C.C. was given by Mr. Benton, who closed his remarks with a tribute to the Commission as follows:

"It is a proud record which the Interstate Commerce Commission has made. The breath of scandal has never touched that Commission. Its judgments have never been swayed by political considerations. No one would claim that it has never been wrong, but it may be justly said that it has always endeavored to be right, and that it has been an able Commission, which has kept its course upon a high plane, and has justly earned the secure and exalted place it holds in the public confidence."

Former Commissioner Farrell (now chief counsel of the I.C.C.) in his remarks traced in outline the history of the enforcement of commission findings and the various court cases by which its status came gradually to be defined and strengthened. Mr. Esch, as the title of his paper indicates, dwelt upon the changes which have occurred in the Commission's work since the passage of the Transportation Act of 1920, and subsequent legislation bearing either directly or indirectly upon the duties of the regulatory body. In conclusion, he said in part:

"In addition to the duties and responsibilities placed upon the Commission, the oldest and most powerful of all the governmental agencies, Congress made it the recipient of a multitude of resolutions asking for information and guidance as to countless subjects relating directly or indirectly to the entire field of transportation. To these resolutions prompt and unbiased reports were submitted, notwithstanding almost all of them carried no appropriations and their cost had to be met out of the Commission's limited funds. It has never shrunk from any task, no matter how difficult or onerous. It has never hesitated to declare its opinions for fear of arousing the hostility of special, political or governmental interests. Keeping within the four corners of the laws it was required to administer, it sought only for the truth, that justness and reasonableness which are the foundations of the public interest."

The President's Letter

President Roosevelt's letter to the Commission follows:

My dear Chairman Miller:

When one takes account of the good work done by the Interstate Commerce Commission since its creation fifty years ago, one smiles at the dire predictions made by certain obviously selfish interests when the law providing for the regulation of interstate commerce was enacted.

The president of a great Eastern railroad declared the law would depreciate Western farm lands by one half. On the Pacific Coast another railroad magnate predicted a panic. This prophecy was re-echoed by another railroad president in the Middle West and, not to be outdone by his brother prophets of gloom, yet another great railroad executive foresaw the ruin of our foreign and domestic commerce.

Those were the opinions of hold-overs from the old "public-be-damned" days—economic fossils which, like the poor, are always with us. Of course, none of these dire prophecies was fulfilled. On the contrary, the railroads and the country went forward to happier and more prosperous times.

The program for the Semi-centennial Exercises of the Commission is a full one and its mere perusal shows its diversified usefulness in the fifty years during which it has been functioning. I want to congratulate the present members of the Commission on the performance of duties which have fallen to them in difficult times. With singular ability and foresight they have met the problems which have confronted them. Their opportunity for constructive service is as great today as when Grover Cleveland named the first Interstate Commerce Commission in the Spring of 1887.

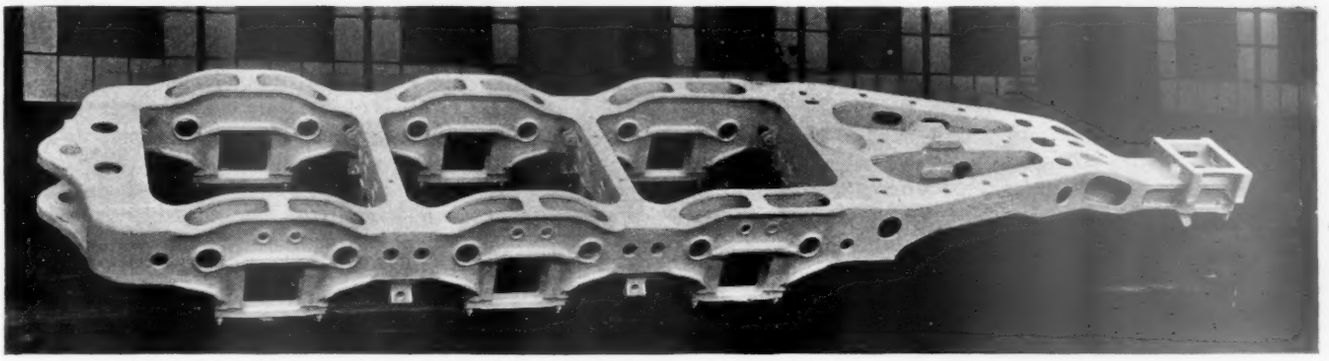
I am reliably informed that when the Founding Fathers created that social, economic and political system of government, which they hoped would be a permanent charter of liberties, they were wholly ignorant of the terms "railroads" and "automobiles," for the very good reason that the first did not come into existence until half a century later and the second were not manufactured until over a century later. The Interstate Commerce Commission is, indeed, fortunate that interpretations of our charter of liberties have allowed it to function during the past half century, through recognition of the fact that an obviously national need can be met only through obviously national action.

Very sincerely yours,

FRANKLIN D. ROOSEVELT

In commemoration of the jubilee, with the co-operation of other bureaus the Bureau of Statistics has prepared a history of the Commission of some 500 mimeographed pages, double-spaced, which later on will be published in printed form.

During its first fifty years of existence 44 men have been members of the Interstate Commerce Commission. There are eleven members of the Commission at the present time and twelve former members of the Commission are still living. The oldest ex-Commissioner is Governor Joseph W. Fifer, who lives at Bloomington, Illinois, and who is in his ninety-seventh year.



Cast-Steel Bed for Pennsylvania GG-1 Electric Locomotives

Steel Castings for High-Speed Railroad Service*

The inherent qualities of cast steel for truck, car, and locomotive frames make for safe-speed operation and low maintenance cost

By W. M. Sheehan

Manager, Eastern District Sales, General Steel Castings Corporation, Eddystone, Pa.

FOR many years the railroads practically monopolized the transportation field. However, in recent years automotive and aerial carriers have provided active competition, made possible by highway and airway development largely financed by public funds. Without this public aid neither competitive service could be provided at anywhere near the present charges.

Despite the unfairness of this subsidized competition, we must realize that it will continue in some degree, and that to meet it the railroads must continue to provide better service and equipment. Although railroad men have grown up with a monopoly, they have made wonderful strides in adapting themselves to this competitive situation. During the past four years the art of railroading has been truly reborn, and this has been a major factor in the return of general prosperity.

The most striking recent changes in railroading, and certainly the most highly publicized, were the advent in 1934 of the Diesel-powered articulated streamlined trains on the Union Pacific and the Burlington, the first built by the Pullman-Standard Car Manufacturing Company and the second by the Edward G. Budd Company. Other roads quickly followed suit, some with steam propulsion, others with Diesel, but each with the objective of better and faster service. With the advent of these trains have come shorter schedules, lower fares, more comfortable riding, and travel luxuries enjoyed on no other land-transport agency in the world.

Included in the older common criticisms of railroad passenger travel are the ones that in summer with the windows open one was covered with cinders and dust, and that it was difficult to converse or read in comfort because of the outside noise. Air conditioning, necessitating sealed windows and closed doors, eliminated the dirt and also some of the noise, for it was found the closed car prevented most of the outside reverberations. Much of the noise noticeable around the ends of passenger cars, which is usually attributed by the lay passenger to the truck and associated parts, is really caused by couplers, buffers, draft gear, foot plate and diaphragms. A great deal of this has been eliminated by improvements in these various parts.

In the study of noise elimination it was found that sheets of rubber or other sound-deadening materials could be inserted between various parts of the truck and car body, thus cutting down the sounds passing into the car. Many modern passenger trucks now embody these features. One improvement which has been made recently in trucks for high-speed trains is the application of brake cylinders directly to the truck frame. By thus attaching all of the brake-foundation parts to the frame, one source of noise is entirely eliminated and a much smoother truck and brake action is assured.

Trucks for High-Speed Trains

Considerable thought, time, and money have been devoted during the past four years to the design of trucks for high-speed passenger trains. The feeling that weight would not permit the use of a six-wheel truck, has confined the studies largely to a four-wheel type. Many different schemes have been tried and with varying suc-

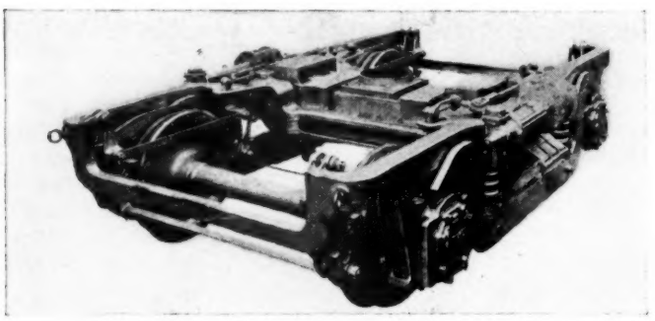
* Abstract of a paper presented before the Central Railway Club of Buffalo on March 11, 1937.

cess. But one point stands out through all of these tests, and that is the importance of getting sufficient spring movement. This has been emphasized in connection with a review of results obtained on the cars of the "Mercury" on the New York Central. It was the desire of this railroad to utilize existing light-weight car bodies and trucks, and to prove the adequacy of these trucks for the required service, some very extensive tests were conducted. As a result, special alloy steel springs were developed with greater movement but same overall dimensions.

It is generally agreed that the riding qualities of the cars on the "Mercury" are very good. The same satisfactory comments are made about the riding qualities of the cars of the "Hiawatha" on the Milwaukee, the Burlington's later "Zephyrs," and the light-weight cars recently built for the Santa Fe. It is interesting to observe that all of these cars are equipped with an orthodox type of cast-steel one-piece four-wheel truck, but with spring movement considerably greater in extent than was previously the practice.

It is generally agreed also that a six-wheel truck gives better riding results than a four-wheel truck. This advantage is associated with the longer wheel-base and the fact that it gives a more perfect equalization between each of its six wheels than does the four-wheel truck.

To secure perfect equalization longitudinally on a four wheel truck, the equalizer fulcrum should be placed central of the wheel. This, however, would not provide vertical stability since there would be a tendency due to weak equalizer springs for the truck frame to lean downward at one end or the other. To prevent this unstable effect, two sets of equalizer springs are provided on each side and spaced apart to insure stability, and at the same time equalize the loads between the wheels.



Four-Wheel Trailing Truck with Cast-Steel Frame Used on the Burlington Zephyrs

On the six-wheel truck, two equalizers are used on each side and the fulcrum correctly spaced one third of the distance between the outer and center wheels. This more perfect equalization removes from the six-wheel truck considerable friction which cannot be taken out of the four-wheel truck without impairing its stability.

Transversely of the truck, the bolsters on both wheel arrangements rest on bolster springs, which are in turn suspended from the truck frame by swing hangers. This provides not only a cushioned transverse equalization of the center-plate load, but also through the swing hangers a controlled lateral movement, which eases the travel of the car through a curve.

One of the most important factors in insuring easier riding on a six-wheel truck is the spring support at each of the four corners of the bolster. This allows not only transverse equalization through the bolster, but due to spring resiliency also permits equalization between diagonally opposite corners of the truck. This combination of substantially perfect longitudinal equalization, cushioned transverse equalization, diagonal equalization and controlled transverse movement, coupled with ample spring range, offers the best mechanical riding arrangement so far developed.

The so-called triple-bolster four-wheel truck, as used on the Union Pacific and Southern Pacific streamlined trains built by Pullman, secures this diagonal equalization by providing coil springs at the four points of application of center-plate load to the truck frame.

Another method of securing the same result is used in the so-called double-bolster four-wheel truck. This provides substantially the same bolster suspension as on the six-wheel truck, giving the same transverse and diagonal equalization, coupled with the usual four-wheel type of longitudinal equalization.

The reason for the general movement toward a four-wheel truck in the last several years has been principally to save weight. But we may well consider a light-weight six-wheel truck, designed to obtain all of the advantages set forth, and which will also provide better braking at high speeds and less heating of the wheel tread from the brakes, all of great advantage on high-speed trains.

Since there are so many of these various new designs of high-speed passenger trucks in service, all of which are being followed closely by the railroads, there is as yet insufficient data on which to reach a conclusion as to the ultimate type which will prevail. It seems safe, however, to predict that when a type is determined upon, it will have a one-piece cast-steel frame and bolster, and thus keep truck maintenance to the same low state that the cast-steel trucks have given during the past thirty years.

Locomotive-Tender Trucks

Nearly thirty years ago the railroads in various sections were experiencing an epidemic of tender derailments. A new design of four-wheel tender truck, embodying the design of passenger-car trucks, stopped the derailments and its use was rapidly extended.

But locomotives grew, and tenders with them. In order to permit longer runs without the frequent taking of water a six-wheel tender truck was developed, and since the only type then in existence was the bottom-equalized passenger truck with a long wheel base, this was utilized. The results obtained were very pleasing to the railroad, but as the overhang at each end was considerable and the clearances were restricted, it was decided to design a special truck with a short wheel base for this tender service.

The result was substantially in principle the six-wheel tender truck so generally used today. The two-pin equalizer originally used for stability has given way to a roller-top equalizer which, while sufficiently stable, is more sensitive and easier on the springs. The tops of wheel pieces have been opened to permit easier application, removal and inspection of truck springs. Truck center plates may now be cast integral and made of sufficient depth so that shims of proper thickness can be applied in the bowl when necessary to vary the tender heights. This truck also puts the brake shoes in the clear so that they can be easily inspected and renewed.

Large-capacity tenders operating at high speeds with swing-motion trucks, have been singularly free from derailments and easy on track and rail, but although they save track maintenance, it is necessary to replace swing-hanger pins and bushings regularly at shoppings. Although the fact that these parts wear is clear evidence that the trucks swing as was intended, it has been ad-

vocated by some that as swing-hanger parts wear and require replacement, this feature should be omitted. Six-wheel tender trucks have been built recently without controlled transverse motion, and while they are lighter than the swing-motion trucks and cost somewhat less, it is firmly believed the track structure will have to take a more severe punishment and this will involve a much greater expense in track maintenance because of the absence of controlled transverse movement.

As the pull at the rear of the tender is greater than that on any other car in the train, because of its position next to the locomotive, the lateral component at rail when curving is correspondingly increased. The center-plate load is also much greater and the center of gravity is higher. Therefore, the importance of controlled transverse movement on tender trucks must be recognized. High track and rail maintenance are penalties for failing to consider this principle. Because of this, the record has been examined and the reasons for using swing-motion tender trucks have been reviewed.

There is at present in experimental operation on a high-speed tender a new type of transverse motion control. It was recently examined at 50,000 miles and was in excellent condition. It utilizes the principle of a roller on an inclined plane and provides the same characteristics as the present swing hangers. It will be necessary to obtain more experience with it before extending its use, but as it promises to simplify greatly the maintenance of the truck parts, while at the same time protecting the track, reference is made to it as a probable further truck improvement.

Cast-Steel Locomotive Frames

No discussion of high-speed railroading would be complete without reference to electrified portions of steam roads. Practically every major electric locomotive project of the past twenty years has utilized cast-steel foundations. The most recent, that of the Pennsylvania Railroad from New York to Washington, utilizes for passenger work the G.G. 1 locomotive which has cut the running time between New York and Washington on the fastest train to three and one half hours for the 225-mile run. This locomotive uses one-piece cast-steel driving and guiding trucks.

It is recognized by those familiar with the problem that the present-day steam locomotive to meet existing and prospectively still higher speed requirements, must take advantage of every factor that will increase its speed, efficiency and availability. To secure this result, recourse is being made to high boiler pressures which permit smaller cylinders and lighter reciprocating parts, the latter contributing to lower dynamic augment at rail. Since it has been proven that locomotives equipped with one-piece cast-steel beds, tender frames, and guiding, trailer and tender trucks can make longer continuous runs without attention and secure a much higher monthly mileage, these also are being incorporated.

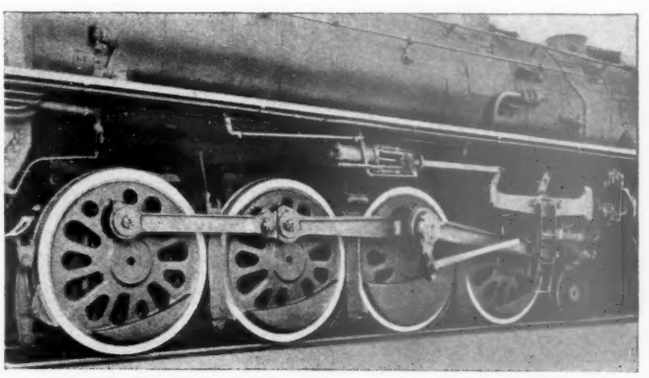
The use of the one-piece steam-locomotive bed, which now embodies integrally the component parts of the frame and cylinder structure, has since its introduction on the New York Central in 1924 been so extended that with very few exceptions it is now being applied on nearly all modern locomotives built not only in the United States and Canada but also in Australia. The almost impossible task of permanently holding together with bolts the parts of the built-up locomotive frame, especially in high-speed service, has been responsible for this transition.

Many passenger locomotives built during the past few years have been streamlined, notably the "Hiawatha" type of the Milwaukee, built by American Locomotive Company, the "Daylight" locomotive of the Southern Pacific, built by Lima Locomotive Works, and the Hudson type of the New Haven built by the Baldwin Locomotive Works. The freedom from bolts afforded by the one-piece cast-steel beds and trucks, which were incorporated in each lot, permitted streamlining with a greater degree of assurance since the problem of foundation maintenance was thereby reduced to a minimum.

Driver-Wheel Centers

Much is being done to reduce the dynamic augment of the driving wheels at the rail. Lighter reciprocating and revolving parts have been introduced as well as cross balancing. While it was realized that this would reduce wear and tear on the machinery, the lower dynamic augment was considered of far greater importance to protect the rails and track and reduce the cost of maintenance of way. The necessity of having a higher degree of track perfection will receive increasing attention from all railroad men in the future.

Much attention has also been paid to the design of the driving-wheel center. Almost from the inception of the steam locomotive, driving-wheel centers have been of the solid individual spoke type. Originally they were made of cast iron, but later of cast steel. The tendency of the



Lackawanna Locomotive Equipped with Boxpok Driving-Wheel Centers

spoked wheel center to flatten at the rim and to crown transversely, both of which contributed to low tire mileage, furnished the incentive to obtain a better construction.

The increasing weights at rail and the higher speeds being demanded of modern locomotives, coupled the desire for a stronger wheel with the recognized importance of securing a lighter wheel. The Boxpok wheel center secures these required factors in combination. It presents a pleasing appearance, will hold its cylindrical contour, and, due to its double-plate construction, will prevent transverse crowning of the rim. This will permit a tighter tire and will give not only more tire mileage but a greater freedom from flat rim spots.

The box-section principle of design is not only followed through the spokes but is also carried out at the rim and hub sections. The large openings between the box spokes permit access for inspection and lubrication. The transverse strength is also much greater than would be obtained with plain solid spokes, and the cross walls of the box-section members give a higher degree of homogeneity than can be obtained with any other arrangement.

The Boxpok wheel center can be made much lighter than the ordinary solid spoked centers and it will allow,

especially in the smaller diameters, a more perfect counter and cross balancing, thus greatly reducing the dynamic augment and the resultant wear and tear on track structure.

Car Underframes

There are now in service over 25,000 cast-steel tender frames and more than 3,000 cast-steel underframes for freight cars, these latter covering almost every type of car. The largest single order was for a lot of 1,500 flat cars built in 1934 by the Pennsylvania. The cast-steel underframe makes the freight car embodying it a much stronger unit and almost indestructible, even in a wreck. Many of these underframes are veterans of quite severe accidents in which other cars of conventional construction in the same wreck were badly damaged or destroyed.

For service involving high-corrosive lading, such as sulphur cars, their use is generally agreed to be essential as it is the only type of underframe which has been able to survive this severe punishment.

The use of steel castings in railroad service today is so general that no historical reference seems necessary. They have in nearly all railway vehicles superseded gray and malleable iron castings, and for almost all but uses requiring resistance to high dynamic stresses, such as main and side rods and axles, have taken the place of forgings.

There has been considerable discussion as to the physical and chemical characteristics of various cast steels for different railway needs. It would seem logical to determine this question largely on the basis of the use to which the particular casting is to be put. It must always be borne in mind that every railway vehicle is subject to the hazards of wreck or other emergency conditions. It is important therefore that structures of the size of beds and tender frames, be made of a material that will withstand much shock and at the same time may be welded readily if damaged in accidents. It is equally important that the casting be made of a material that will withstand deformation with the least amount of fracture, for often in wrecks portions are likely to be bent out of shape. And when this occurs it is essential that it can be readily straightened.

For this reason a low-carbon steel similar to the A.S.T.M. specifications, Grade A was selected, and the results over long periods have been most satisfactory. As there are many machined surfaces on these large integral castings, heat-treatment subsequent to their machining would warp them and impair their usefulness. On the other hand, by proper selection of welding rod and using accepted welding technique, damaged portions of these low carbon steel castings can be repaired with the expectation of permanently successful results.

Conditions encountered in service with these large castings clearly indicate that it is wise both with lower-carbon steels as well as alloys to sacrifice some degree of tensile strength in order to obtain toughness and weldability.

Experience over a great many years evidences that a properly designed steel casting of the minimum thickness which may be satisfactorily cast, will give excellent results if made of this low carbon shock resisting steel. There are of course uses such as driving-wheel centers where, because of special requirements such as withstanding axle and crank pin pressure fits, a harder steel is required. There are also cases where alloys can be economically introduced at a higher cost in order to obtain minimum weight and maximum strength, but these must be treated and considered as special individual cases.

Communications . . .

The Railway Age cannot publish letters from readers who do not supply their names and addresses. Names of correspondents are not published, or disclosed even upon inquiry, unless the correspondent consents. But they must be given us as an evidence of good faith.

Are Railroads Going Sissy?

New York

To the Editor:

Today I read a piece of unique news. One of the air transportation lines is going to build a 40-ton super-airliner, designed to carry forty passengers. Railroad cars are getting lighter, and cute, while airplanes are getting heavier, thus making this branch of transportation more of a real he-man's game every day.

When the day comes when I can't ride in a real heavy railroad car, I'll get myself a trailer and travel by auto. I'll do all my lightweight travelling in street cars, or buses. When it comes to a long distance journey, give me the 95-ton Pullman or an 80-ton de-luxe coach. These types of cars have proven for a long time that they can stand any kind of hard knocks and rough handling —thus they're good enough for me.

Speed? The only real great accomplishment of speed is that it has caused a great amount of cemetery planning—60 minutes to the hour and 24 hours to the day. All the speed in the world can't hurry Old Man Time.

If railroading is to be a real man's game for a long time to come, then they better not get too serious about this streamline and light weight propaganda. Congratulations, Mr. Harriman, for an excellent 85-cent dinner on a U.P. diner (standard, of course).

L. J. Callanan

Smoking on Trains

43 Hillcrest Road, Madison, New Jersey

To the Editor:

I have been interested in the letters appearing recently in Railway Age, which have mentioned the "smoke nuisance" which the air-conditioned cars seem to have made worse than ever.

I, too, want to say that there is a growing laxity on the part of trainmen who fail to stop smoking in cars not provided for those who wish to smoke. Nowadays, probably because of the air conditioning, selfish or unthinking persons smoke anywhere they feel like it, with the result that persons who either do not smoke, or have an allergy to it, have no place to go where they may be free of the nuisance.

A few weeks ago I made a trip in a parlor lounge car on a southwestern railroad. It was a very comfortable air-conditioned car, but in addition to the smoking compartment ash receivers were scattered throughout the body of the car, inviting smoking there, too. It was not long before the air in the car was so thick you could cut it with a knife. Upon complaining to the porter he said the air conditioning was doing all it could without creating drafts, so I had the most uncomfortable six hours I have ever had in a parlor car, for there was no place—except possibly a day coach—where I could get away from the smoke.

I have even seen smoking in the body of a Pullman sleeper, to the annoyance of other passengers, but the crew did nothing about it. So far air-conditioning equipment cannot change the air in a car often enough to clear out the smoke—if several are smoking—and I believe that the non-smokers should have some place in the car where they may be free of that annoyance which causes many acute physical discomfort.

Here is hoping that the railroads will again confine smoking to the places provided for it, and see that the train crews in all cases strictly enforce the rules regarding smoking.

Thomas T. Taber

NEWS

Labor Act Upheld by Supreme Court

Unanimous opinion declares back shop employees are interstate workers

The Supreme Court, in a unanimous opinion read by Justice Stone, on March 29, upheld the constitutionality of the Railway Labor Act as amended in 1934 and declared that the act applied to back-shop mechanical workers of a railroad. The case was brought by the Virginian against the System Federation No. 40. The railroad had contended that the back-shop mechanical men who were engaged in building and repairing cars and locomotives were not engaged in interstate commerce. The court held that since the men were working on equipment which was to be used to haul interstate traffic, they were definitely engaged in interstate commerce. The decision also upholds the validity of the National Mediation Board certificate designating System Federation 40 as the duly accredited representative of the back-shop employees.

The court after reviewing the history of the controversy turned to a discussion of the relationship of the back-shop employees to interstate commerce. Noting the Virginian's contention that the act as applied to these employees "is not within the commerce power since their duties have no direct relationship to interstate commerce," the decision goes on to hold that the repair work is on equipment used by the petitioner in transportation service —"97 per cent of which is interstate." The activities of the back-shop employees, it adds, "have such a relation to other confessedly interstate activities . . . that they are to be regarded as a part of them. . . . The relation of the back shop to transportation is such that a strike of petitioner's employees there, quite apart from the likelihood of its spreading to the operating department, would subject the petition to the danger . . . of interruption of the transportation service."

The court found "no answer" in the railroad's contention that it could close its shops and turn over the repair work to contractors. This, it is conceded, "is a question of railroad management," but it is nevertheless held that the road's determination to do its own repairs has brought its relations with shop employees within the purview of the railway labor act.

On the question of the validity of the National Mediation Board certificate the court discussed the railroad's contention that a majority of those eligible to vote must favor a union before the latter may be accredited. System Federation 40 received the certificate after it was favored by a majority of those voting. The court in this connection notes that the law confers the right of determination on a majority of those eligible to vote "but is silent as to the manner in which that right shall be exercised." It proceeds to cite cases wherein election laws have been generally construed as requiring only the consent "of the specified majority of those participating in the election," quoting one of the cited authority to the effect that those who do not participate "are presumed to assent to the expressed will of the majority of those voting." The court also notes that "the absence of eligible voters may be due less to their indifference than to coercion by the employer."

$76,795,318 Net for Two Months

Return of 2.56 per cent compares with $69,290,873 or 2.31 per cent in 1936

Class I railroads in the first two months of 1937 had a net railway operating income of $76,795,318, which was at the annual rate of return of 2.56 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics of the Association of American Railroads. In the first two months of 1936, their net railway operating income was $69,290,873 or 2.31 per cent on their property investment, and in the first two months of 1930, their net railway operating income was $113,013,227 or 3.79 per cent on property investment. Gross operating revenues for the first two months of 1937 totaled $653,611,402 compared with $599,488,651 for the same period in 1936, and $868,785,724 for the same period in 1930, an increase of nine per cent in 1937 above 1936, but 24.8 per cent below 1930. Operating expenses for the first two months of 1937 amounted to $497,810,612 compared with $467,616,505 for the same period in 1936, and $679,039,178 for the same period in 1930. Operating expenses for the first two months of 1937 were 6.5 per cent greater than in 1936, but 26.7 per cent below 1930.

Class I railroads in the first two months of 1937 paid $57,336,021 in taxes compared with $42,871,796 in the same period in 1936, and $57,179,390 in the same period in 1930. For February alone, the tax bill of the Class I railroads amounted to $28,863,316, an increase of $7,556,030 or 35.5 per cent above February, 1936.

Thirty-two Class I railroads failed to

(*Continued on page 613*)

Class I Railroads—United States

	1937	1936	1930
Month of February			
Total operating revenues	$321,926,715	$300,430,323	$422,864,774
Total operating expenses	244,146,472	235,875,419	326,700,317
Taxes	28,863,316	21,307,286	28,239,638
Net railway operating income	38,358,638	33,562,341	58,367,529
Operating ratio—per cent	75.84	78.51	77.26
Rate of return on property investment—per cent	2.43	2.13	3.72
Two Months Ended February 28			
Total operating revenues	$653,611,402	$599,488,651	$868,785,724
Total operating expenses	497,810,612	467,616,505	679,039,178
Taxes	57,336,021	42,871,796	57,179,390
Net railway operating income	76,795,318	69,290,873	113,013,227
Operating ratio—per cent	76.16	78.00	78.16
Rate of return on property investment—per cent	2.56	2.31	3.79

Express Business Up

The Railway Express Agency handled during 1936 a total of 131,549,530 shipments, an increase of more than 11 per cent as compared with 1935, according to the March issue of the Express Messenger. The Air Express division reported for February an increase of 71.7 per cent in the number of air express shipments into and out of New York City, as compared with February, 1936.

Railroad Day at Great Lakes Exposition

August 8 has been designated as Railroad Day, and June 22 as Railway Business Women's Association Day, by the Great Lakes Exposition, which re-opens in Cleveland, Ohio, on May 28 for a run of 101 days. A. F. Whitney, president of the Brotherhood of Railroad Trainmen, will act as general chairman on August 8, and Miss Florence Haas as general chairman on June 22.

Would Supervise B. & M. Finances

R.F.C. lists conditions under which it will grant note extension

The Reconstruction Finance Corporation has informed the Interstate Commerce Commission that it will not extend for two years a past due note for $7,569,437 of the Boston & Maine now held by the corporation unless the R.F.C. can exercise a stringent control over the financial management of the road. This information was contained in a letter to the commission from George R. Cooksey, secretary of the R.F.C. The Reconstruction Finance Corporation took this action after the commission had approved the two year extension without imposing the conditions stipulated by the R.F.C.

The conditions prescribed by the R.F.C.'s board of directors are as follows:

"1. That the extension be effected by the substitution of a new note of the railroad dated February 1, 1937, in the amount of $7,569,437 payable on or before February 1, 1939, or at any time prior thereto on demand of this corporation and bearing interest at the rate of 5 per cent per annum, payable semi-annually.

"2. That the railroad submit evidence satisfactory to assistant general counsel or special counsel for this corporation that each and all of the loans from the various banks in the aggregate principal amount of $5,500,000 have been extended to a date not earlier than February 1, 1938.

"3. That the railroad pay to this corporation all accrued interest on its existing note for $7,569,437 to February 1, 1937.

"4. That the new note of the railroad in the amount of $7,569,437 be secured by the property now held by the corporation as security for the existing note of the railroad in the amount of $7,569,437.

"5. That the railroad agree in form approved by assistant general counsel or counsel for this corporation that, so long as it is indebted to this corporation, it will give to this corporation at least fifteen days' prior notice of its intention to make any payment or payments in reduction of any or all outstanding loans to banks; that upon receipt of said notice, this corporation shall have the right to require a reduction of the railroad's indebtedness to this corporation in the same proportion as any proposed payment or payments to any bank or banks would operate to reduce the entire indebtedness of the railroad to all banks and that, in the event of such payment not being made to this corporation on demand, said new note for $7,569,437, may, at the option of this corporation, be declared due and payable in full.

"6. That the railroad shall agree with this corporation that so long as it shall be indebted to this corporation the railroad shall not contract any short-term loans or pledge any additional collateral to secure any loans without the prior written consent of this corporation.

"7. That the railroad submit evidence satisfactory to general counsel or assistant general counsel for this corporation that the $1,097,000 principal amount of the railroad's sinking fund improvement bonds actually outstanding, which matured February 1, 1937, have been paid or that adequate provision has been made for such payment.

"8. That the railroad submit satisfactory evidence to general counsel, special counsel or assistant general counsel that the maturity of the $5,000,000 principal amount of Fitchburg Railroad general-mortgage bonds which matured on February 1, 1937, has been extended so that $200,000 principal amount thereof shall mature on each January 1 from January 1, 1938, to January 1, 1949, both inclusive, and that $2,600,000 principal amount thereof has been extended so as to mature on July 1, 1949.

"9. That the railroad furnish an opinion of its vice president of finance and accounting, in form satisfactory to this corporation, of the railroad's ability to pay at maturity $934,000 principal amount of Portsmouth, Great Falls & Conway Railroad first-mortgage bonds due June 1, 1937.

"10. That the railroad agree in form approved by assistant general counsel or special counsel for this corporation that so long as it is indebted to this corporation it will not increase the compensation of any of its officers, directors and any employees to any amount not permitted by the terms of the agreement dated August 30, 1933, between this corporation and the railroad.

"11. That, except as modified in said resolutions, the terms and conditions prescribed by the Interstate Commerce Commission and by this corporation shall be and remain in full force and effect.

"In accordance with the action taken by the directors of this corporation with respect to interest rebates to railroad borrowers that have complied with the requirements of this corporation with respect to salaries, 4 per cent interest, only, will be collected on the above mentioned new note (provided receivers in equity are not appointed for said railroad or a petition in bankruptcy is not allowed by the court) until there has been further action by our directors changing the rate of interest currently charged."

Eastern Presidents Appoint Wage Committee

The Eastern Presidents' Conference, at a meeting in New York on March 29, appointed a committee to investigate the procedure to be followed in connection with the wage increase demands of railway labor unions. Members of the committee are: J. W. Smith, vice president and general manager of the Boston & Maine, J. G. Walber, vice president, personnel, of the New York Central, R. W. Brown, operating vice president of the Reading, H. A. Enochs, chief of personnel of the Pennsylvania, and H. D. Barber, assistant to operating vice president of the Erie.

Pact Ends Strike Threat in Canada

Unions and managements in agreement on plan for restoration of cuts

Organized Canadian railwaymen, 117,000 strong, and managements of the two Canadian railways this week in Montreal reached an agreement which removed the threat of a tie-up in the Dominion's transportation.

Members of the 18 standard unions will have the entire deduction returned to them in progressive steps within the next year.

A joint statement by the railways and the train service unions at the close of a conference in the Canadian Pacific executive offices in Montreal read:

"Parties to the railway wage dispute reached an amicable settlement today. The agreement between the 18 labor organizations and the railways provides for the removal by progressive steps of the entire 10 per cent wage deduction within a period of 12 months from April 1, 1937.

"The deduction which became nine per cent on the first of February becomes eight per cent on April 1;

"Seven per cent on June 1;

"Six per cent on August 1;

"Five per cent on October 1;

"Four per cent on December 1;

"Two per cent on February 1, 1938;

"The remaining two per cent to be removed at the end of March, 1938, thus restoring the basic rates from April 1, 1938.

"The employees had contended for earlier resumption of basic rates but finally agreed to accept the proposal for the elimination of the deductions by March 31, 1938, by the progressive steps herein outlined.

"Having regard to all the factors the parties to the dispute express their mutual satisfaction in the terms of settlement. They also go on record that the good feeling which has long existed between the railways and their employees is fully preserved."

The pact terminated a controversy which began in March, 1935, when union officers applied for a board of conciliation to weigh their request for return of a 10 per cent cut in wages voluntarily accepted by employees early in 1932.

Howard B. Chase, chairman of the general conference committee of the 18 unions which met last week for a showdown, officially sanctioned the agreement.

"The statement," Mr. Chase said, "includes the unions' views. We want to make clear, however, that the fight for the wage restoration was Canadian-born and Canadian-fought. Some papers said American higher-ups forced it on us. This effort to win higher wages has nothing to do with the United States.

"There was no influence from the other side of the line," he added. "The vice-presidents and the general conference committee of the unions were empowered by the Canadian railwaymen, and the settle-

(Continued on page 613)

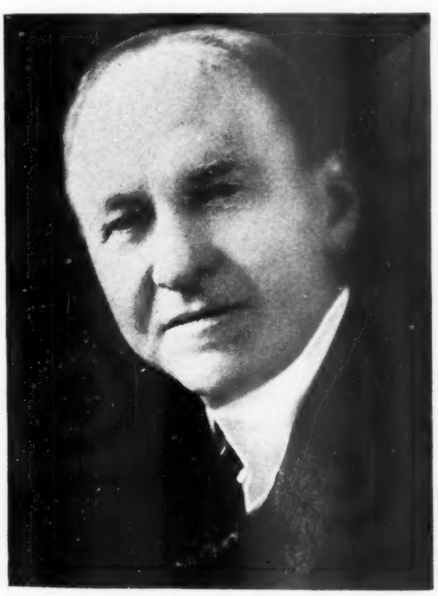
Buckland Becomes O. & W. President

Chairman takes on position as J. H. Nuelle goes to coal Company and L. & N. E.

Edward G. Buckland, chairman of the board of directors of the New York, Ontario & Western, has been elected also president of that road to succeed J. H. Nuelle, who has resigned to become president of the Lehigh Coal & Navigation Company and the Lehigh & New England. Mr. Nuelle succeeds S. D. Warriner, who has been elected chairman of the boards of both companies.

Mr. Buckland will continue also in his other present positions of chairman of the board of the New York, New Haven & Hartford and president of the Railroad Credit Corporation. Other executive changes on the O. & W. are reported in the "Railway Officers" columns of this issue.

Edward G. Buckland has been engaged in railway legal and financial work for the past 39 years, during which time he has been continuously connected with the New Haven; and he has been chairman of the O. & W. board since 1929. Mr. Buckland was born at Buffalo, N. Y., on December 31, 1866, and was educated at Washburn College, Topeka, Kans. (B.A., 1887; LL.D., 1921), and at Yale University, New Haven, Conn. (LL.B., 1889; M.A., 1895). For the first nine years following his graduation from the Yale Law School (1889-1898), he was engaged as an assistant professor at Yale and as a practicing attorney. In 1898 he entered railway service with the New York, New Haven & Hartford as an attorney, serving in this capacity until 1906. In 1907 he was elected vice-president and general counsel of the New Haven, holding this position until 1924, with the exception of the federal control period from 1918 to 1920, when he served as president of the corporation. In 1924 Mr. Buckland became vice-president in charge of law, finance and corporate relations, and, five years later, was elected chairman of the board. In February, 1932, he was elected also president of the Railroad Credit Corporation.



E. G. Buckland

Kaiden-Keystone Photos

Joseph H. Nuelle

Joseph Henry Nuelle was born on April 9, 1881, at Chicago, Ill., and was educated at Phillips Exeter Academy (1903) and Princeton University (1906). He entered railway service with the Pennsylvania in 1907 as rodman and from 1908 to 1912 he served as assistant engineer of the New York, Ontario & Western. Mr. Nuelle has been continuously in the service of the New York, Ontario & Western since 1908. In 1912 he was appointed engineer maintenance of way and from 1913 to 1915 he was chief engineer. He was appointed assistant general superintendent in 1915 and the following year became general superintendent. Mr. Nuelle served as federal manager from 1918 to 1920 and in the latter year became general manager, which position he held until 1923, when he became vice-president and general manager. He served in the latter capacity until 1930, when he became president.

Pacific Railway Club

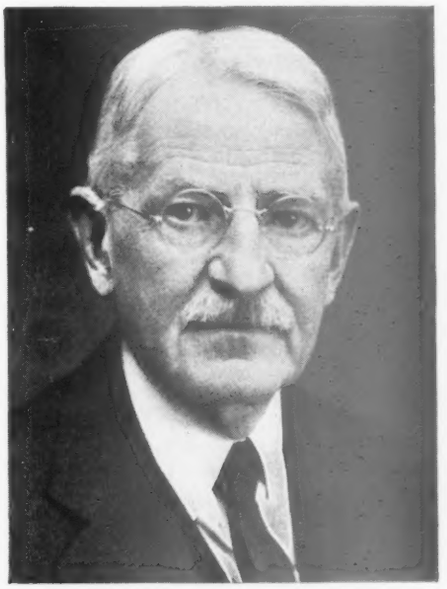
Stuart Daggett, professor of transportation, University of California, whose election as first vice-president of the Pacific Railway Club was announced in the *Railway Age* of March 20, has resigned from that position because of his having been granted his Sabbatical leave by the University. Mr. Daggett's resignation advances the other officers so that William P. St. Sure, vice-president of the Key System and East Bay Transit Company, becomes first vice-president and Clinton A. Veale, assistant superintendent on the Southern Pacific, becomes second vice-president. A. M. Reinhardt, general freight agent of the Atchison, Topeka & Santa Fe, succeeds Mr. Veale as treasurer.

Rudd, Penna. Signal Engineer, Retires

Widely recognized authority has been indentified with signaling for 49 years

Alexander Holley Rudd, widely recognized authority on railroad signaling practices, retired on March 31, from the active service of the Pennsylvania as chief signal engineer of the system, having reached the age of 70 years. Mr. Rudd's experience in dealing with signaling problems has extended over more than 49 years, a longer period, so far as is known, than has been devoted to this branch of railroading by any other professional engineer. His work has been an important influence in the development of the art of railroad signaling throughout America and even abroad.

A native of Lakeville, Conn., Mr. Rudd was graduated from the Sheffield Scientific School of Yale University in 1886, at the age of 19. In the same year he entered the Pennsylvania service as a draughtsman, first in the real estate department and later in the signal department. Beginning with 1892 he had 11 years of a varied experience in signal work on the New York Central, the New York, New Haven & Hartford and the Delaware, Lackawanna & Western, returning to the Pennsylvania March 1, 1903, as assistant signal engineer of the lines east of Pittsburgh. He became signal engineer August 1, 1907, and on March 1, 1920, was made chief signal engineer of the entire system.



Alexander H. Rudd

In 1905, Mr. Rudd collaborated with Frank Rhea, of the engineering department of the Pennsylvania lines west of Pittsburgh, in the preparation of a comprehensive survey of signaling methods, which in large part formed the basis for

(*Continued on page 613*)

C.N.R. Debt Bill Passed by House

Measure provides for recasting capital structure of the government road

Final passage was given in the House at Ottawa this week to the bill of Hon. C. D. Howe, Minister of Transport, to recast the debt set-up of the Canadian National. There were more protests from the Conservative leader, Rt. Hon. R. B. Bennett, against the plan which he said would "mislead and misinform" the Canadian public as to the actual financial position of the railway, while Mr. Howe said elimination of duplication in the balance sheet of the railway and the accounts of the federal treasury was essential for many reasons. Earlier in the session he told the special committee that financial men in New York City had expressed surprise at the duplication of certain features in the two accounts and thought it should be removed.

Mr. Bennett in opening discussion on the bill asserted it to be a sound principle that "the balance sheet of the Canadian National should show every item constituting the assets and liabilities of that institution," and this balance sheet did not comply with that condition. As a result of the changes made in the balance sheet, he continued, there had disappeared those particulars which were essential if the people of Canada were to understand the true position of their enterprise.

It was essential that the amount of money the Canadian people had invested in the enterprise should always be shown, said the Conservative Leader, because the enterprise was owned and operated by the people of Canada, because freight rates were affected, and because not only freight rates but also salaries and emoluments paid to the employees of the road were affected. Moreover, the reduction by $262,000,000 of the cost of the property or the assets of the property was an operation which should not have been performed without "very clear evidence of the reasons for this action."

"A balance sheet," Mr. Bennett concluded, "should disclose to everyone a full and complete statement of the condition of the enterprise to which it refers. If it fails to do that it is deceptive; if it does not fail it is accurate. This, as it now stands, will have the effect of not only evading the provisions of the Consolidated Audit Act but it will also mislead and misinform, for no one reading will be able to understand what is meant by the five or six million shares representing proprietor's equity, securities now held by the Minister of Finance in trust for the people of Canada. It serves no useful purpose and departs from well settled principles, and cannot do other than mislead and misinform."

W. A. Walsh (Cons., Mount Royal) said that since the second reading of the bill, which approved its principle, the Minister had changed the measure so that it provided for the revision of the accounting set-up of the balance sheet of the Dominion.

Later in his speech he held the late Sir Henry Thornton responsible for building the hotel in Vancouver, but Angus MacInnis (C.C.F., Vancouver East) denied this and said Sir Henry had not been in favor of building the hotel, but that its construction was the result of an agreement between the former Canadian Northern and the city.

"We are setting up a balance sheet," said the Minister, in reply, "that eliminates the duplication of debt as between the present railway balance sheet and the net debt of Canada. We are including in the new railway balance sheet all the debt of the railway that is not carried as part of the debt of Canada. That is the full test of what shall be retained as debt in the balance sheet. If it is in the net debt of Canada it is eliminated as debt from the Canadian National balance sheet. What was formerly debt as between the Dominion Government and the railway is continued in the balance sheet as proprietor's equity."

"It seems to me," said Mr. Howe in conclusion, "that this legislation is going to give the officers and employees of the railway a more reasonable objective to attain. Surely the earning power of a property must have some relation to the investment in that property. By setting up the investment in the property as the capital, rather than a largely inflated sum, it will put new hope in those responsible for the operation of the property." The bill was then given third reading on division.

Government Ownership Bill Introduced

Representative Dunn, of Pennsylvania, has introduced a bill, H.R. 5811, which provides for the taking over by the government of the railroads and other things in connection with the expenditure by the government of thirty billion dollars in the next five years "to provide employment and to end poverty in the United States."

Air Brake Executive Lectures Before N. Y. U. Engineers

Lewis K. Sillcox, first vice president of the New York Air Brake Company, Watertown, N. Y., delivered an address on "Time Rules Transport" on March 31, in Lassman Hall of the New York University School of Commerce, New York City. Mr. Sillcox discussed cost, speed and safety in the operation of modern fast passenger trains.

Associated Traffic Clubs Meeting

Three principal speakers will be on the program of the spring meeting of the Associated Traffic Clubs of America, at the Commodore Hotel, New York, on April 20 and 21. They are Ralph Budd, president of the Chicago, Burlington & Quincy; Henry Bruere, president of the Bowery Savings Bank, New York, and chairman of the committee on railroad securities of the National Association of Savings Banks; and Merle Thorpe, editor of Nation's Business.

Rock Island Would Drop Train Control

Seeks to discontinue system in service on 166.4 miles of double-track line

The Chicago, Rock Island & Pacific has petitioned the Interstate Commerce Commission for authority to discontinue the maintenance and operation of automatic train control in service on 166.4 miles of double-track main line on the Chicago and the Rock Island divisions between Blue Island, Ill., and Rock Island, which has been in service since November 1, 1923, having been installed in compliance with the commission's order of June 13, 1922. The equipment in service includes 291 roadside ramps and train control apparatus on 87 locomotives.

In the petition the railroad sets forth several reasons for desiring to discard the train control, which are abstracted as follows: (1) The equipment is obsolete; (2) new high-speed Diesel-propelled streamline trains are to be introduced on this territory and it is questionable whether the intermittent contact type train control will operate satisfactorily for these new trains; (3) the automatic block signaling, in service on this territory since 1908, should be modernized to permit handling trains in either direction on both tracks. Centralized traffic control should be initiated on certain sections and extended over the entire zone, Blue Island to Rock Island, as business conditions warrant. These improvements will require a very considerable capital expenditure, estimated at $500,000. The application of automatic train control devices to the said modernized automatic block signal system will introduce serious complications and very heavy expenses.

The petitioners believe the capital expenditures necessary to modify and expand automatic train control devices to correspond with the high-speed train schedules about to be initiated, and with the modernization of the present automatic block signal system between Blue Island and Rock Island, would provide greater safety and greater benefit in improved service if used for the above-mentioned improvement program and the extension of signaling facilities, chiefly automatic block signals, on the other sections of the railroad where such do not now exist.

In addition to expenditures for signaling as outlined above on the Chicago and Rock Island divisions, the petitioners are entering on an important expansion program on other parts of the railroad, and submitted a list of eight signaling projects requiring a total expenditure of $670,375, which have been approved for 1937 construction. The proposed program for 1938 and subsequent years includes 18 projects involving a total expenditure of $5,712,500.

Some of the other arguments set forth in the petition for eliminating the train control were: (1) That no accidents have occurred on the Des Moines division since the train control was removed from that

territory in February, 1933, and furthermore, that the Rock Island's safety record indicates that train control is not reasonably necessary on the Chicago and Rock Island divisions; (2) the maintenance of the train control now in service amounted to $42,537 out-of-pocket expense during 1935; (3) a summary of accidents investigated and reported on by the Interstate Commerce Commission during the period January 1, 1930, to November 30, 1936, which might reasonably have been prevented by automatic block signals, appears to indicate automatic block signals should have preference for capital expenditures.

The petition closes with a plea that if the commission does not grant the petition to remove the train control or does not take action by April 1, that the Rock Island be permitted to operate the new Diesel-propelled trains without train control equipment.

Great Western Labor Investigation

Senator Borah of Idaho has introduced a resolution which would order the senate committee on interstate commerce to investigate the present wage controversy between the Chicago Great Western and the National Railroad Adjustment Board. The senator told the senate that he understood that the board had failed in its efforts to persuade the trustees of the railroad to recognize the validity of the award and that a strike was threatened.

Railroads to Exhibit at Texas Exposition

Ten railroads have taken space for exhibits in the Hall of Transportation at the Greater Texas and Pan American Exposition, which will be reopened in Dallas, Tex., on June 12. These include: The Southern Pacific; the Texas & Pacific; the Atchison, Topeka & Santa Fe; the Chicago, Burlington & Quincy; the Chicago, Rock Island & Pacific; the Missouri-Kansas-Texas; the Missouri Pacific; the St. Louis Southwestern and the St. Louis-San Francisco.

New Haven Subsidiary Settles Strike

A 36-hr. strike of Massachusetts and Rhode Island bus drivers and machinists of the New England Transportation Company was settled on March 29 by agreement of union leaders and officers of the company, a New Haven highway subsidiary. According to the terms of the settlement, the company promises to recognize the drivers' and machinists' unions and grant a five per cent wage increase to the former. Both parties agree to set up a committee for discussion of wage scales for machinists.

Hearings on Rail Signal System Bill

A hearing was held on March 19 before the House committee on interstate and foreign commerce on H.R. 185, the bill sponsored by organized railroad labor to increase the power of the Interstate Commerce Commission with respect to requiring railroads to install safety control systems. A. E. Lyon, president of the Brotherhood of Railroad Signal Men of America, appeared in support of the bill. The bill was opposed by the railroads. A companion measure, S. 29, has been favorably reported to the Senate by the committee on interstate commerce.

New Haven Would Abandon Boat Lines

Trustees of the New York, New Haven & Hartford on March 26 filed petitions with the United States District Court at New Haven, Conn., for permission to discontinue steamboat operations of the Providence and New Bedford lines of its subsidiary, the New England Steamship Company. The New York-Providence line offers daily freight and passenger service in both directions between those points, while the New York-New Bedford line has operated three days a week in each direction during three summer months.

The petition, which stated that the New England has failed to earn operating expenses from 1928 through 1936, also asked authority to sell four steamboats. Other routes operated by the New England include the New York-Fall River line, the New York-New Haven line, and the New Bedford, Martha's Vineyard and Nantucket line.

Winners of B. & O. Royal Blue Model Contest

Fletcher G. Speed of New Rochelle, N. Y., has won the first prize of $500 in the Baltimore & Ohio Contest for the best working model of its New York-Washington train, the Royal Blue. Other prizes in the contest which closed on March 15 were won by George F. Nixon, Baltimore, Md., $300; Robert Gaston, Baltimore, $100; Elmer M. Smith, Baltimore, $50; Howard Staely, St. Louis, Mo., $25. The judges were W. Averill Harriman, chairman of board, Union Pacific; Charles W. Galloway, vice-president of operation and maintenance of the Baltimore & Ohio, and Otto Kuhler, artist and designer, New York.

According to the rules of the contest, the first and second prizes became the property of the Baltimore & Ohio, which in turn immediately presented the first prize to Smithsonian Institution for permanent keeping and display. Dr. Alexander Wetmore, assistant director, accepted the model for the Institution. The second prize will be exhibited by the B. & O. on a specially-constructed model railroad, which is an exact reproduction of the B. & O.'s three-track line on the Cumberland division. The model railroad, as well as the prize-winning models of the Royal Blue, were on public display in the Museum of Natural History, Washington, until April 1, when the exhibit was moved to the Museum of Science and Industry, Rockefeller Center, New York, where it will be shown from April 15 to May 15.

C. N. R. Would Control Proposed Transcontinental Air Line

There will be government control and a predominant government stock ownership in the trans-Canada airways project, it was disclosed this week in the House at Ottawa by Hon. C. D. Howe, Minister of Transport, who in anticipation of objections from members of the various opposition groups, including Rt. Hon. R. B. Bennett, stated that while the bill as originally introduced did not contain the provision, there would be an amendment which would provide that the Canadian National which is to act as the agent of the government, will hold 51 per cent of the air company's shares.

Second reading was given to the measure after an hour's debate and without a division; and the legislation is now in the committee stage, where the amendment promised by the Minister will be made. All who spoke in the debate said they favored such a trans-Canada air service, but many of them were critical of some of the measure's terms and of the means by which Mr. Howe proposed to establish the enterprise.

Safe Transport for Explosives

The railroads of the United States and Canada, in the past 10 years, have transported billions of pounds of dynamite, black powder and other dangerous explosives without a single explosion taking place and without any person being killed or injured. This record has been disclosed in the Annual Report for 1936 of the Bureau of Explosives, Association of American Railroads. In 1936, the railroads of the United States and Canada

Admiring the First Prize-Winning Model of the Royal Blue of the Baltimore & Ohio

Left to right: C. W. Van Horn, general manager eastern lines, B. & O.; Dr. Alexander Wetmore, assistant director, Smithsonian Institution; Otto Kuhler, artist and designer, New York; and C. W. Galloway, vice-president operation and maintenance, B. & O. Messrs. Galloway and Kuhler were two of the judges, the third, W. Averill Harriman, chairman of the Board of the Union Pacific, not being present when this picture was taken.

transported approximately 400,000,000 pounds of dangerous explosives, which included, among other things, dynamite, high explosives of all kinds, black powder, blasting caps and fulminate of mercury. In 1935, the amount transported was approximately 370,000,000 pounds.

The railroads in 1936 also transported great quantities of other dangerous articles such as gasoline, acids and corrosive liquids, inflammable liquids, and compressed gases, without loss of life except in the case of gasoline which was responsible for four deaths. In 1935, nine persons were killed in connection with the transportation of these commodities. Property loss in 1936 from accidents resulting in fires, leakages and losses due to the transportation of dangerous articles other than explosives totaled $525,827, of which amount $252,000 resulted from accidents in connection with the transportation of gasoline. Property loss from such accidents in 1935 totaled $518,726.

Increased Loadings Estimated

Freight car loadings in the second quarter of 1937 are expected to be about 7.5 per cent above actual loadings in the same quarter in 1936, according to estimates just compiled by the 13 shippers' regional advisory boards. All except the Mid-West board estimate an increase in the loadings.

On the basis of these estimates, freight car loadings of the twenty-nine principal commodities will be 5,730,219 cars in the second quarter of 1937, compared with 5,331,496 actual loadings for the same commodities in the corresponding period in 1936.

The tabulation below gives the estimates by districts and comparisons with actual loadings of 1936:

Shippers' Advisory Boards	Actual Loadings 1936	Estimated Loadings 1937	Per cent Increase
Allegheny	749,891	825,481	10.1
Pacific Coast ...	217,042	224,825	3.6
Pacific Northwest.	172,517	199,881	15.9
Southeast	551,880	584,825	6.0
Southwest	334,922	354,834	5.9
Great Lakes	432,061	469,571	8.7
Atlantic States ..	583,685	606,355	3.9
Central Western.	171,145	174,970	2.2
New England ...	107,946	114,011	5.6
Northwest	352,560	491,450	39.4
Mid-West	740,111	718,469	2.9D.
Ohio Valley	630,189	664,754	5.5
Trans-Missouri-Kansas	287,547	300,793	4.6
Total	5,331,496	5,730,219	7.5

Of the commodities for which increases compared with the same period in 1936, are estimated in the second quarter of 1937 those showing the largest percentage of increase are: Ore and concentrates, 47.3 per cent; iron and steel, 21.9 per cent; cement, 16.1 per cent; lime and plaster, 14.2 per cent; lumber and forest products, 13.9 per cent; machinery and boilers, 13.2 per cent; agricultural implements and vehicles other than automobiles, 11.2 per cent; and paper, paper board and prepared roofing, 10.8 per cent.

Pacific Northwest Board Meeting

A 22.5 per cent increase in carloadings for the Pacific Northwest, during the second quarter of the year, as compared with the same period last year, was forecast by commodity committees at the thirty-fifth regular meeting of the Pacific Northwest Advisory Board, held at Portland, Ore., on March 25. A total of 214,000 carloads are anticipated, as compared with 175,056 in the same quarter last year, this year's total exceeding that of any similar period since the second quarter of 1930, when 271,557 cars were loaded.

At a joint luncheon of the advisory board and the principal transportation and service clubs of Portland, Samuel O. Dunn, chairman of the Simmons-Boardman Publishing Corporation, and editor of the *Railway Age*, was the guest speaker. He discussed the general transportation situation and stated that if the railroads are to be permitted to continue operation under private management and make the improvements in their properties that are necessary to handle satisfactorily the commerce of this country, it is the duty of everyone interested in a dependable transportation system to oppose vigorously the enactment of the many unnecessary and expensive bills now pending in Congress.

New Information System at Grand Central

A new system for receiving and answering questions over the telephone was placed in operation on April 1, in the information bureau of Grand Central Terminal, New York.

The operation of this new "three-order turret system" is largely automatic. If all the receiving operators are busy answering questions, the excess incoming calls are stored electrically in the order received and then answered in turn as fast as a wire is cleared. Clerks do not have to throw keys as heretofore.

The new system, and an enlarged force of 22 clerks, six more than previously, will enable the Bureau to handle a great many more calls and do this more expeditiously. The average number of calls is about 20 per minute though at times it reaches a peak of twice this number.

The Bureau is housed in new quarters on an upper floor of Grand Central Terminal in a room equipped with a special sound absorbing ceiling. To meet any emergency whereby the normal supply of electric current might be cut off, wet batteries of sufficient capacity to operate the Bureau's apparatus for several days have been installed. Expansion and modernization of the Bureau was necessitated by the considerable increase in railway travel which is under way.

Canadian Roads in February

An increase of $1,235,349 in operating revenue and an improvement of $760,354 in net revenue for February, 1937, as compared with February, 1936, is shown in the monthly statement for the Canadian National's all-inclusive system.

Operating revenues last month were $14,301,856, as compared with $13,066,507 for the corresponding month of last year; operating expenses were $13,829,961, against $13,354,967. There was a net revenue last month of $471,894, as compared with a net deficit of $288,460 for February, 1936.

For the first two months of 1937 the C. N. R. reported an increase in revenues of $2,536,147 over the similar period of last year, operating revenues amounting to $28,345,208, as against $25,809,061. Operating expenses for the two months of 1937 were $27,790,092, as compared with $26,673,852 for the January-February period of 1936. Net revenue was $555,116, compared with a net deficit of $864,791 for the corresponding period of last year, an improvement of $1,419,907.

The Canadian Pacific reported for February net profits at $990,739, against $867,397 for February, 1936, an increase of $123,324. Gross at $9,724,628 showed an increase of $444,035 over last year, while operating expenses at $8,733,889 showed an increase of $320,692.

For the first two months of 1937 net profits at $1,904,248 compared with $1,479,969 for the corresponding two-month period of last year, an increase of $424,279. Gross for the two-month period at $19,918,692 showed an increase of $1,314,276, while operating expenses at $18,014,443 showed an increase of $889,997.

Easter Travel Heavy

Easter week-end brought a heavy passenger movement on Eastern railways. The early date does not seem to have affected the volume, and the demand for equipment in most cases exceeded preliminary estimates.

Transportation of students increased travel on those roads serving college and preparatory school towns. New England roads reported a number of extra trains for students returning home for Spring recess. Also, several lines operated school tours to Washington, D. C., and New York. The New York Central experienced heavy traffic on Good Friday, handling 17 extra inbound and 11 outbound trains at Grand Central terminal, New York. All through trains carried heavy consists. While excursion travel on the New Haven was not up to last year's figures, regular coach travel was heavy. Due especially to the numbers of home-bound students from New England colleges, the operation of extra trains was found necessary.

The Central of New Jersey reported a marked increase over last Easter's traffic, especially on suburban and New York-Philadelphia runs. Atlantic City, N. J., and Lakewood drew large crowds. The Baltimore & Ohio ran several extra trains and added cars to all through trains out of New York, the movement to Washington, D. C., being especially heavy. During this week that road is conducting a large number of all-expense tours for school children to the Capitol from various points on the system.

The Erie reported heavy travel out of New York City to main-line points in lower New York State, which required extra cars on most trains. This road estimated that the Easter period brought a 25 to 30 per cent increase over its normal week-end traffic. The Lehigh Valley experienced a substantial increase in patronage on its Buffalo, N. Y., and Niagara Falls special excursions. Extra sections of through trains indicate a healthy increase over the Easter traffic of 1936.

Although preliminary figures indicate

that it did not exceed last year's Easter week-end business, travel on the Delaware, Lackawanna & Western was, nevertheless, over 300 per cent higher than that of a normal week-end.

$76,795,318 Net for Two Months

(*Continued from page 607*)

earn expenses and taxes in the first two months of 1937, of which eight were in the eastern district, four in the southern and twenty in the western.

Class I railroads for February alone had a net railway operating income of $38,358,638, which, for that month, was at the annual rate of return of 2.43 per cent on their property investment. In February, 1936, their net railway operating income was $33,562,341 or 2.13 per cent on investment, and in February, 1930, was $58,367,529 or 3.72 per cent return on investment. Gross operating revenues for the month of February amounted to $321,926,715 compared with $300,430,323 in February, 1936, and $422,864,774 in February, 1930. Operating expenses in February totaled $244,146,472 compared with $235,875,519 in the same month in 1936, and $326,700,317 in February, 1930.

Class I railroads in the eastern district for the first two months in 1937 had a net railway operating income of $50,953,743, which was at the annual rate of return of 3.61 per cent on heir property investment. For the same period in 1936, their net railway operating income was $52,002,194 or 3.69 per cent on their property investment, while in 1930 it was $65,166,356 or 4.76 per cent on their property investment. Gross operating revenues of the Class I railroads in the eastern district for the first two months in 1937 totaled $333,886,293, an increase of 5.4 per cent compared with 1936, but a decrease of 24.2 per cent compared with 1930. Operating expenses totaled $224,154,926, an increase of 4.3 per cent above the same period in 1936, but a decrease of 28.1 per cent under the first two months of 1930. Class I railroads in the eastern district for February had a net railway operating income of $25,692,115 compared with $27,310,501 in February, 1936, and $32,227,201 in February, 1930.

Class I railroads in the southern district for the first two months of 1937 had a net railway operating income of $11,239,585, which was at the annual rate of return of 2.20 per cent on their property investment. For the same period in 1936, their net railway operating income amounted to $10,035,381, which was at the annual rate of return of 1.97 per cent on their property investment, and for the same period in 1930 was $15,651,613 or 2.94 per cent on investment. Gross operating revenues of the Class I railroads in the southern district for the first two months in 1937 amounted to $85,620,336, an increase of 8.5 per cent compared with the same period in 1936, but a decrease of 26.6 per cent under the same period in 1930. Operating expenses totaled $64,724,391, an increase of 5.6 per cent above the same period in 1936, but a decrease of 29.4 per cent under 1930. Class I railroads in the southern district for February had a net railway operating income of $6,347,095 compared with $5,332,732 in February, 1936, and $8,074,668 in February, 1930.

Class I railroads in the western district for the first two months in 1937 had a net railway operating income of $14,601,990, which was at the annual rate of return of 1.35 per cent. For the same two months in 1936, the railroads in that district had a net railway operating income of $7,253,298, which was at the annual rate of return of .67 per cent, and for the same period in 1930 was $32,195,258 or 2.99 per cent on investment. Gross operating revenues of the Class I railroads in the western district for the first two months' period in 1937 amounted to $234,104,773, an increase of 14.8 per cent above the same period in 1936, but a decrease of 24.9 per cent under the same period in 1930. Operating expenses totaled $188,931,295, an increase of 9.7 per cent compared with the same period in 1936, but a decrease of 23.7 per cent under the same period in 1930. For February alone, railroads in the western district reported a net railway operating income of $6,319,428 compared with $929,108 for the same roads in February, 1936, and $18,065,660 in February, 1930.

Pact Ends Strike Threat in Canada

(*Continued from page 608*)

ment was initiated and brought to a conclusion by the Canadian railwaymen."

Agreement dispelled a threat of a paralyzing strike which has loomed since early in February when union leaders flatly rejected the majority report of the conciliation board, which ended several months of deliberations by recommending that railways give their employees three per cent of the ten per cent deduction in serrated steps before the year's end.

Two days later, both Canadian Pacific and Canadian National railways announced they would accept the majority report and return one per cent retroactive to February 1. Union leaders, meantime, instituted a strike poll of their 117,000 members.

While the poll was in progress, Minister of Labor Norman Rogers on several occasions summoned labor chiefs and railway officers to Ottawa for conferences, which, however, failed to lighten the danger of a walkout as local union assemblies from coast-to-coast reported overwhelming pro-strike sentiment.

Upwards of 50 members of the unions' general conference committee gathered in Montreal March 18, ostensibly to tabulate officially returns from the strike ballot. Silent throughout, they nevertheless made it evident that the poll authorized a strike, by warning Sir Edward Beatty and S. J. Hungerford, presidents of Canadian Pacific and Canadian National, that they would order a strike unless the ten per cent was speedily restored.

Repeated secret conferences, between unions and the railways and between opposing factions among union chiefs, brought negotiations to an impasse after a week of parleys. The Minister of Labor, calling the disputants to Ottawa, paved the way for the pact.

While the majority of the general conference committee was at home for the Easter holiday, those who remained met to consider the conflicting issues in the struggle. Two hours debate, reliable sources said, convinced them that the railways' offer ought to be accepted. The afternoon agreement was reached thereafter without dissension. The general conference committee will now meet in plenary session to give the settlement formal approval.

Rudd, Pennsylvania Signal Engineer, Retires

(*Continued from page 609*)

unifying signaling practices on the Pennsylvania system. This "Rudd-Rhea Report" was a prominent feature in most signaling discussions for several years.

When the Pennsylvania's main line suburban area, stretching twenty miles west of Philadelphia, was electrified in 1916, the adoption of the overhead wire suspension system, known as "cross catenary," presented new signaling problems. The lattice effect of the wires and poles, it was felt, might tend to obscure the semaphore wayside signals then in use. To meet this situation Mr. Rudd collaborated with Dr. William Churchill, technician of the Corning Glass Works, in the production of the "position light" signals mounted on bridges over the tracks and giving the same indications by day and by night. These are now a familiar sight throughout the Pennsylvania and some other lines. A few years later Mr. Rudd pioneered in recognizing the value of cab signals and brought about their adoption by the Pennsylvania for its heavy traffic high speed lines. Under compulsion of the government cab signals are now in use to a limited extent on important roads throughout the country, but the Pennsylvania has been in a class by itself in extensive (voluntary) development of the continuous system.

As chairman of the Committee on Highway Protection, of the Signal Section of the American Railway Association (now Association of American Railroads), Mr. Rudd has been largely instrumental in the design and adoption of the standard flashing light signal now in general use for railroad grade crossings, and has been a leader in educating public opinion concerning crossing signals throughout the country.

Mr. Rudd has been active in numerous professional societies and organizations. He is a member and past president of the Yale Engineering Association and the Railway Signal Association, now incorporated in the Association of American Railroads, and is a life member of the American Railway Engineering Association. He was, on July 5, 1910, elected the first foreign honorary member of the In-

stitution of Signal Engineers of Great Britain.

He served actively on various committees of the National Conference on Street and Highway Safety, first called by President Hoover, then Secretary of Commerce, in 1924; called again by Mr. Hoover in 1926; by Robert P. Lamont, Secretary of Commerce, in 1930; and by Daniel C. Roper, Secretary of Commerce, in 1934. He has also been a member of various committees of the American Engineering Council. He has contributed many articles to railroad and engineering magazines and delivered numerous addresses and lectures on the history and development of railway signaling, automatic train control, cab signals, highway crossing protection and similar subjects.

Meetings and Conventions

The following list gives names of secretaries, date of next or regular meetings, and places of meetings:

AIR BRAKE ASSOCIATION.—T. L. Burton, Room 1440, 466 Lexington Ave., New York, N. Y.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, 836 S. Michigan Ave., Chicago, Ill. To meet with Air Brake Association, Car Department Officers' Association, International Railway Master Blacksmiths' Association, International Railway General Foremen's Association, Master Boiler Makers' Association, and the Railway Fuel and Traveling Engineers' Association. Exhibit, September 28-30, 1937, Hotel Sherman, Chicago, Ill.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, F. T. R., M. & O. R. R., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 816 McCormick Bldg., Chicago, Ill. Annual meeting, September, 1937, Boston, Mass.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York, N. Y.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, Union Station, St. Louis, Mo. Annual meeting, June 8-10, 1937, Palmer House, Chicago, Ill.

AMERICAN ASSOCIATION OF RAILWAY ADVERTISING AGENTS.—E. A. Abbott, Poole Bros., Inc., 85 W. Harrison St., Chicago, Ill.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I. & L. Ry., 836 S. Federal St., Chicago, Ill. Annual meeting, October 11-13, 1937, Mayflower Hotel, Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, 319 N. Waller Ave., Chicago, Ill. Annual meeting, October, 19-21, 1937, Hotel Stevens, Chicago, Ill. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY CAR INSTITUTE.—W. C. Tabbert, 19 Rector St., New York, N. Y.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—E. J. Hoddy, Louisville & Nashville, R. R., Louisville, Ky.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in co-operation with the Association of American Railroads, Division IV.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 15-17, 1938.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—M. W. Jones, Baltimore & Ohio R. R., Mt. Royal Station, Baltimore, Md.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C., M., St. P. & P. R. R., 11402 Calumet Ave., Chicago, Ill.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—R. E. Schindler, Union Trust Bldg., Washington, D. C. Annual meeting, October 18-19, 1937, Chicago, Ill.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—C. E. Davies, 29 West 39th St., New York, N. Y. Semi-annual meeting, May 17-21, 1937, Hotel Statler, Detroit, Mich.

Railroad Division.—Marion B. Richardson, 21 Hazel Ave., Livingston, N. J.

AMERICAN TRANSIT ASSOCIATION.—Guy C. Hecker, 292 Madison Ave., New York, N. Y.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 1427 Eye St., N. W., Washington, D. C. Annual meeting, January 25-27, 1938, Chicago, Ill.

ASSOCIATION OF AMERICAN RAILROADS.—H. J. Forster, Transportation Bldg., Washington, D. C.

Operations and Maintenance Department.—J. M. Symes, Vice-President, Transportation Bldg., Washington, D. C.

Operating-Transportation Div.—L. R. Knott, 59 E. Van Buren St., Chicago, Ill. Annual meeting, May 19-20, 1937, Hotel Stevens, Chicago, Ill.

Freight Station Section.—R. O. Wells, 59 E. Van Buren St., Chicago, Ill.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y. Annual meeting, June 7-8, 1937, Hotel Traymore, Atlantic City, N. J.

Protective Section.—J. C. Caviston, 30 Vesey St., New York, N. Y. Annual meeting, May 26-27, 1937, Hotel Cleveland, Cleveland, Ohio.

Safety Section.—J. C. Caviston, 30 Vesey St., New York, N. Y. Annual meeting, May 11-13, 1937, Hotel Statler, St. Louis, Mo.

Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York, N. Y. Annual meeting, Oct. 5-7, 1937, Medinah Club, Chicago, Ill.

Division IV.—Engineering.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 15-17, 1938.

Construction and Maintenance Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill.

Electrical Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill.

Signal Section.—R. H. C. Balliet, 30 Vesey St., New York, N. Y.

Division V.—Mechanical.—V. R. Hawthorne, 59 E. Van Buren St., Chicago, Ill. Annual meeting, June 16-23, 1937, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers Association.

Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y. Annual meeting, June 21-23, 1937, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers Association.

Division VII.—Freight Claims.—Lewis Pilcher, 59 E. Van Buren St., Chicago, Ill. Annual meeting, June 15-17, 1937, Royal York Hotel, Toronto, Ontario, Canada.

Division VIII.—Motor Transport.—George M. Campbell, Transportation Bldg., Washington, D. C.

Car-Service Division.—C. A. Buch, Transportation Bldg., Washington, D. C.

Finance, Accounting, Taxation and Valuation Department.—E. H. Bunnell, Vice-President, Transportation Bldg., Washington, D. C.

Accounting Division.—E. R. Ford, Transportation Bldg., Washington, D. C. Annual meeting, June 2-4, 1937, Hotel Traymore, Atlantic City, N. J.

Treasury Division.—E. R. Ford, Transportation Bldg., Washington, D. C.

Traffic Department.—A. F. Cleveland, Vice-President, Transportation Bldg., Washington, D. C.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—F. L. Johnson, Claim Agent, Alton R. R., 340 W. Harrison St., Chicago, Ill. Annual meeting, May 26-28, 1937, Netherland Plaza Hotel, Cincinnati, Ohio.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., 1519 Daily News Bldg., 400 W. Madison St., Chicago, Ill. Semi-annual meeting, June, 1937, Atlantic City, N. J. Annual meeting, October, 1937, Hotel Sherman, Chicago, Ill. Exhibit by Railway Electrical Supply Manufacturers' Association.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—W. S. Carlisle, National Lead Company, 900 W. 18th St., Chicago, Ill. Meets with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2271 Wilson Ave., N. D. G., Montreal, Que. Regular meetings, second Monday of each month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS' ASSOCIATION.—A. S. Sternberg, M. C. B. Belt Ry. of Chicago, 7926 S. Morgan St., Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 W. 55th St., Chicago, Ill. Regular meetings, second Monday of each month, except June, July and August, La Salle Hotel, Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—E. G. Bishop, Illinois Central System, East St. Louis, Ill. Regular meetings, third Tuesday of each month except June, July and August, Hotel Statler, St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—Mrs. M. D. Reed, 1817 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, second Thursday of each month except June, July and August, Hotel Statler, Buffalo, N. Y.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—(See Railway Fuel and Traveling Engineers' Association.)

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn. Annual meeting, September 28-29, 1937, Hotel Sherman, Chicago, Ill.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y. Annual meeting, September 29-30, 1937, Hotel Sherman, Chicago, Ill.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—Clyde S. Bailey, 806-808, 13th and E Sts., N. W., Washington, D. C. Annual meeting, August 31-September 3, 1937, Salt Lake City, Utah.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. H. White, Room 1826, 208 S. La Salle St., Chicago, Ill.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, second Tuesday of each month, except June, July, August and September, Hotel Touraine, Boston, Mass.

NEW YORK RAILROAD CLUB.—D. W. Pye, 30 Church St., New York, N. Y. Regular meetings, third Friday of each month, except June, July and August, 29 W. 39th St., New York, N. Y.

PACIFIC RAILWAY CLUB.—William S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month, alternately at San Francisco and Oakland, excepting June at Los Angeles and October at Sacramento.

RAILWAY BUSINESS ASSOCIATION.—P. H. Middleton, First National Bank Bldg., Chicago, Ill.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. Regular meetings, fourth Thursday of each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. McC. Price, Allen-Bradley Company, 600 W. Jackson Blvd., Chicago, Ill. Meets with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—P. A. Bissell, 40 Broad St., Boston, Mass. Annual meeting, October 19-20, 1937.

RAILWAY FUEL AND TRAVELING ENGINEERS' ASSOCIATION.—T. Duff Smith, 1255 Old Colony Bldg., Chicago, Ill. Annual meeting, September 28-30, 1937, Hotel Sherman, Chicago, Ill.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. To meet with Mechanical Division and Purchases and Store Division, Association of American Railroads, June 16-23, 1937, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. A. R. Division I.

RAILWAY TIE ASSOCIATION.—Roy M. Edmonds, 1438 Syndicate Trust Bldg., St. Louis, Mo.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Annual meeting, September 14-16, 1937, Hotel Stevens, Chicago, Ill.

SIGNAL APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. A. R., Signal Section.

SOCIETY OF OFFICERS, UNITED ASSOCIATIONS OF RAILROAD VETERANS.—M. W. Jones, Baltimore & Ohio, Mt. Royal Station, Baltimore, Md. Annual meeting, October 9-10, 1937, Richmond, Va.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—D. W. Brantley, C. of Ga. Ry., Savannah, Ga. Semi-annual meeting, July 15, 1937.

TOOL FOREMEN SUPPLIERS' ASSOCIATION.—E. E. Caswell, Union Twist Drill Co., 11 S. Clinton St., Chicago, Ill. Meets with American Railway Tool Foremen's Association.

TORONTO RAILWAY CLUB.—R. H. Burgess, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, fourth Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

TRACK SUPPLY ASSOCIATION.—D. J. Higgins, Gardner-Denver Company, 332 S. Michigan Ave., Chicago, Ill. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—(See Railway Fuel and Traveling Engineers' Association.)

WESTERN RAILWAY CLUB.—C. L. Emerson, C. M., St. P. & P., Chicago, Ill. Regular meetings, third Monday of each month, except June, July, August and September, Hotel Sherman, Chicago, Ill.

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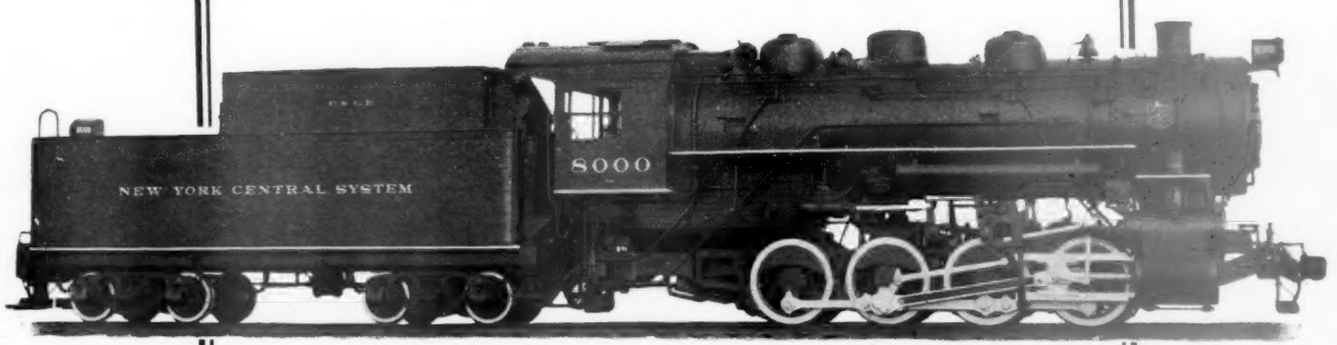
LIMA BUILT SWITCHERS

for the

New York Central System



These locomotives will be used on the Lines of the PITTSBURGH AND LAKE ERIE RAILROAD.

Cylinders 25 x 28 Drivers 52
Boiler Pressure 190 lbs.
Weight on Drivers 230,000 lbs.

Tender Capacity
10,000 Gal. Water 16 Tons Coal

LIMA
LOCOMOTIVE WORKS
INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

Equipment and Supplies

Equipment Orders Placed in March

Upward trend characteristic of first two months carries forward

Domestic orders for equipment during March continued the upward trend characteristic of railway purchasing thus far in 1937. The 29 locomotives placed on order during the month brings the total of the first quarter of the year to 108. Contracts for 6,200 freight cars and 162 passenger-train cars swell the 1937 car orders to 27,613 and 386, respectively.

These totals compare strikingly with those of the corresponding quarter of 1936, such comparison revealing about a 50 per cent increase in locomotive buying in 1937 over last year; specifically, a difference of 35 units. Although the March total, 29 locomotives, is lower than that of January and February, 46 and 33 units respectively, locomotive inquiries outstanding at the close of last month stood at the 40 mark—22 for domestic service and 18 for export.

Railroads ordered three times more freight cars for domestic service in the first quarter of 1937 than in the corresponding quarter of 1936. It required more than six months of buying for 1936 orders to reach the 27,613 total of 1937's first three months. The heaviest orders this year were placed in January and February, when they passed the 10,500 mark in each month. Along with the March total of 6,200 cars must, however, be considered the business pending in outstanding inquiries for 12,000 cars.

March orders for domestic passenger-train cars bring a total of 386 for the first quarter of 1937, which is more than five times the 69 ordered during the corresponding quarter of last year; and is a larger total than that reached in the entire twelve months of any year since 1930, excepting 1934, which topped it by 2 cars. In contrast to locomotive and freight car orders, the number of passenger-train cars ordered in March exceeds that of either January or Ferbuary. In addition orders were placed in Canada for 30 passenger cars, and at the close of the month, inquiries were outstanding for 89 cars—39 for domestic service and 50 for Canada.

Domestic Equipment Orders Reported in Issues of the Railway Age in March, 1937

LOCOMOTIVES

Date	Name of Company	No.	Type	Builder
Mar. 6	St. Louis Southwestern	5	4-8-4	Company Shops
Mar. 6	Atchison, Topeka & Santa Fe.	1	Diesel-elec.	Electro-Motive Corp.
Mar. 13	Chicago, West Pullman & Southern	2	0-6-0	Baldwin Locomotive Works
Mar. 13	Northern Pacific	8	4-8-4	Baldwin Locomotive Works
	(Spokane, Port. & S.)	3	4-8-4	Baldwin Locomotive Works
	" " "	6	4-6-6-4	American Locomotive Co.
Mar. 27	Youngstown & Northern	2	Diesel-elec.	American Locomotive Co.
		2	Diesel-elec.	Electro-Motive Corp.

FREIGHT CARS

Mar. 6	Norfolk & Western	1,000	Hopper coal	Virginia Bridge Co.
		1,000	Hopper coal	Bethlehem Steel Co.
Mar. 6	Northern Pacific	750	Gondola	Pressed Steel Car Co.
		250	Gondola	American Car & Foundry
		500	Flat	Bethlehem Steel Co.
		500	Box	Pacific Car & Foundry
Mar. 13	Duluth, Missabe & Northern.	500	Ore	General American
Mar. 13	Missouri-Kansas-Texas	50	Ballast (Hart)	American Car & Foundry
Mar. 13	Detroit, Toledo & Ironton	400	Box	Greenville Steel Car Co.
		350	Automobile	Bethlehem Steel Co.
Mar. 20	Grand Trunk Western	100	Refrigerator	Pullman-Standard
		200	Automobile	Pullman-Standard
Mar. 27	Central of Georgia	500	Box	Pullman-Standard
		100	Auto-furniture	American Car & Foundry

PASSENGER-TRAIN CARS

Mar. 6	Central of Georgia	5	Coaches	Bethlehem Steel Co.
		3	Express	Bethlehem Steel Co.
Mar 6	St. Louis Southwestern	10	Coaches	Pullman-Standard
Mar. 6	Atchison, Topeka & Santa Fe.	30	Deluxe coaches	Edward G. Budd Mfg. Co.
		10	Diner	
		6	Club-lounge	
		6	Club-baggage	
Mar. 13	Erie	80	Milk	Greenville Steel Car Co.
Mar. 13	Great Northern	12	Coaches	Pullman-Standard

LOCOMOTIVES

THE YOUNGSTOWN & NORTHERN is in the market for one 0-6-0 switching type locomotive.

THE MISSOURI PACIFIC has ordered four 600-hp. Diesel-electric switching locomotives for use at various points, and two 900-hp. Diesel-electric locomotives for use between St. Louis, Mo., and Kansas City, from the Electro-Motive Corporation. Inquiry for this equipment was reported in the *Railway Age* of January 30.

FREIGHT CARS

THE UNION PACIFIC is informally asking for prices on from 750 to 3,000 freight cars, the information to be used in preparing appropriations.

THE LEHIGH & NEW ENGLAND has ordered 75 covered hopper cars of 70 tons' capacity, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of March 27.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 550 freight cars for the Wisconsin Central, placing 250 automobile, 100 general service and 100 hopper cars with the Pullman-Standard Car Manufacturing Company and 100 Rodger ballast cars of 50 tons' capacity with the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of March 20.

PASSENGER CARS

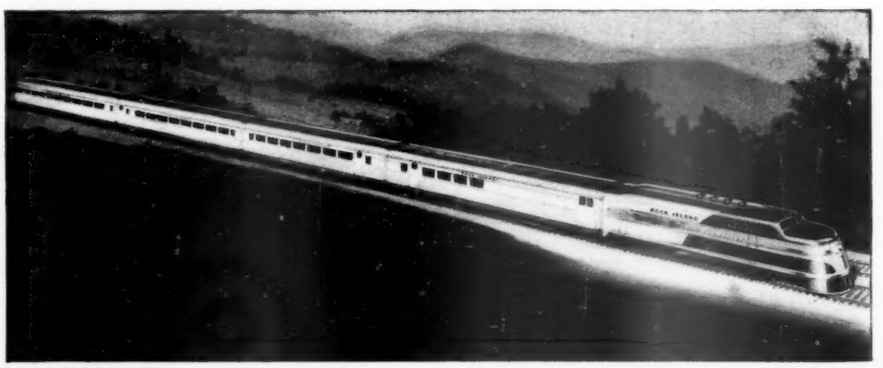
THE GRAND TRUNK WESTERN is inquiring for three 73-ft. 6-in. baggage cars.

THE NORFOLK & WESTERN has ordered nine postal cars from the Bethlehem Steel Company. Inquiry for this equipment was reported in the *Railway Age* of March 13.

IRON AND STEEL

THE NORTHERN PACIFIC has ordered 255 tons of structural steel for turntables from the American Bridge Company.

* * * *



Rock Island Lines Photo

An Artist's Sketch of One of the "Rockets" Being Constructed by the Edward G. Budd Manufacturing Company for the Chicago Rock Island & Pacific

Continued on next left-hand page

LONG LIFE

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Wear cannot be eliminated but it can be minimized and performance safeguarded.

Replacement parts are as important as the original device because they are the parts that take the brunt of the service—the parts that need replacement are the parts subjected to wear.

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Their use means minimum replacement costs and maximum service life.

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FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

Supply Trade

James D. Ryan, treasurer of the **Ryan Car Company,** Chicago, has been elected vice-president and treasurer.

C. Miles Burpee, research engineer of the Delaware & Hudson, has resigned to become vice-president of the railroad division of the **Chipman Chemical Company,** Bound Brook, N. J., with headquarters at Chicago.

The American Brake Shoe & Foundry Company and its **Southern Wheel Division,** has moved the St. Louis sales office to the Railway Exchange building, St. Louis, Mo. O. W. Spencer will continue as representative for both companies at St. Louis.

George McM. Godley, who was president of the **Burden Iron Company, Inc.,** Troy, N. Y., during 1935 and 1936, has been elected to fill the unexpired term of President **Alfred Musso,** who has resigned; **Arthur S. Swan,** vice-president, and **Frank Hodson,** assistant to the president, also resigned. **O. A. Van Denburgh, Jr.,** a former manager of the company, has been placed in charge of operations.

Richard M. Ramport has been appointed sales representative of the **General American Transportation Corporation,** with headquarters at Chicago, to assist in the sales of freight cars and special car equipment. **O. J. Parks,** manager of sales in the freight car department, has been appointed general superintendent of the tank car repair department, to succeed **I. A. Eakins,** retired.

Lawrence H. Lund has been elected assistant treasurer of the **Westinghouse Electric & Manufacturing Company.** Mr. Lund joined the Westinghouse Electric International Company on January 7, 1921, as auditor and has remained with that organization until his election as assistant treasurer of the parent company. He will have his headquarters at East Pittsburgh, Pa. Mr. Lund is auditor and director of various subsidiary companies of the Westinghouse Electric International Company.

Frank L. Johnson has been recently appointed vice-president in charge of sales and operations of the western district of the **Pressed Steel Car Company, Inc.,** with headquarters at Chicago. Mr. Johnson was born in Chicago, and attended elementary schools and college in that city. He entered the employ of the Pressed Steel Car Company, in the engineering department, at Chicago, in 1906 and on January 1, 1913, was transferred to the western district sales department as sales agent. In January, 1928, he was promoted to assistant general sales manager, western district, and in July, 1933, to general sales manager, western district, where he has been up to the present time. Since February, 1934, he has served as vice-president Pressed Steel Car Company of Illinois.

Roland W. Burt has been appointed eastern manager of railroad sales for **Joseph T. Ryerson & Son, Inc.,** with

(c) Koehne

Roland W. Burt

headquarters at the Jersey City, N. J., office of the company. Mr. Burt has been with the Ryerson company for 14 years, advancing through its various sales divisions to the position of sales representative in the state of Indiana. Later Mr. Burt took charge of railroad sales at St. Louis, Mo.

Craig W. Marshall has been appointed district manager, eastern territory, railroad division of **The Dayton Rubber Manufacturing Company,** with headquarters at 11 Park Place, New York

Craig W. Marshall

City. He succeeds E. J. Schmidt, who has been transferred to the home office division, where he will act in an executive sales engineering capacity. Mr. Marshall has been associated for the past 11 years with the Sunbeam Electric Manufacturing Company, as eastern sales manager of railroad equipment.

OBITUARY

George F. H. Hicks, president of the Harris Track Laying Company, died in Chicago on March 23 of a heart attack.

Lester R. Hardy, vice-president in charge of railroad sales of the Great Lakes Supply Corporation, died in Chicago on March 24 of a heart attack.

Construction

CHESAPEAKE & OHIO.—A contract has been let to the Langhorne & Langhorne Company, Huntington, W. Va., to extend the eastbound and the westbound passing tracks at South Ruffner, W. Va., at a cost of about $63,400, and bids will be asked for dredging Slip No. 1 to 25 ft. depth at Presque Isle, Ohio, to cost about $46,900.

FORT WORTH & RIO GRANDE-TEXAS & PACIFIC.—A contract has been awarded to Ben Sira & Co., Dallas, Tex., for the construction of a reinforced concrete and steel overpass to carry Ballinger street, Fort Worth, Tex., over the tracks of these companies. The cost of this project (approximately $100,000) will be borne jointly by the F. W. & R. G., the T. & P. and the City of Fort Worth.

MISSOURI PACIFIC.—This company has been authorized by Federal Judge George H. Moore, St. Louis, Mo., to enter into an agreement with the City of Kansas City, Kan., for the construction and use of railroad tracks on the city's public levee. The work will cost about $47,000, of which the railroad will pay one-half.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—The East St. Louis (Ill.) city council has approved the revised plans of the Terminal Railroad Association of St. Louis for the construction of a reinforced concrete subway to carry Broadway under part of the railroad company's switching yards adjacent to the proposed union station on South Main street at Brady avenue. The new subway, which will replace a 50-year-old timber and steel viaduct that carries Broadway over the railroad tracks and Cahokia creek westward from Third street, will be approximately 900 ft. long and will extend between Third street and a point 110 ft. west of John street. It will extend under eight railroad tracks and across Cahokia creek. The subway will carry a 40-ft. roadway and a 6-ft. sidewalk on each side. It will cost approximately $400,000.

VIRGINIAN.—A contract has been awarded to W. W. Boxley & Company, Roanoke, Va., for the construction to subgrade, except superstructures for steel bridges, of that part of this company's Clear Fork branch between Simon, W. Va., and Oceana, a distance of 13 miles. See *Railway Age* March 13, page 455.

WABASH.—An agreement has been reached between this company and the City of St. Louis, Mo., under which the grade crossings on the Wabash at Maple avenue and Olive street road will be eliminated by the construction of subways. At Maple avenue, where the railroad tracks are to be raised eight feet, the proposed project will cost about $290,000, and is expected to be carried out in the near future. Construction of the subway at Olive street, to cost about $600,000, will be undertaken when the necessary funds become available.

Continued on next left-hand page

NO. 9 OF A SERIES OF FAMOUS ARCHES OF THE WORLD

ARCH OF DRUSUS, ROME

The so-called Arch of Drusus is probably of Trajan's time. It is built of travertine blocks partly covered with marble, and at each side are marble columns. Caracalla conducted an aqueduct over it for the supply of his famous *thermae*, or baths.

The engineering design of the Security Brick Arch embodies years of experience in locomotive operation, constant study of combustion problems and careful research into refractory materials. Security Brick Arches render maximum fuel economy at minimum cost.

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Financial

AKRON, CANTON & YOUNGSTOWN.—*Annual Report.*—The 1936 annual report of this company and its subsidiary, the Northern Ohio, shows net income, after interest and other charges, of $161,147 as compared with net income of $122,041 in 1935. Selected items from the consolidated income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	171.31	171.31	.....
RAILWAY OPERATING REVENUES	$2,264,737	$1,986,860	+$277,877
Maintenance of way	357,173	330,418	+26,755
Maintenance of equipment	197,966	205,250	−7,283
Transportation	642,431	611,001	+31,429
TOTAL OPERATING EXPENSES	1,411,406	1,335,299	+76,106
Operating ratio	62.29	67.19	−4.90
NET REVENUE FROM OPERATIONS	854,033	651,913	+202,119
Railway tax accruals	151,729	91,239	+60,490
Hire of freight cars	224,598	178,400	+46,198
Joint facility rents	30	30	.....
NET RAILWAY OPERATING INCOME	483,149	383,048	+100,101
Non-operating income	528,115	478,523	+49,592
Interest on funded debt	335,979	331,131	+4,848
TOTAL DEDUCTIONS FROM GROSS INCOME	366,968	356,482	+10,485
NET INCOME	$161,147	$122,041	+$39,106

ALABAMA, TENNESSEE & NORTHERN.—*Reorganization.*—The Interstate Commerce Commission, Division 4, has issued an order permitting the Secretary of the Treasury of the United States to intervene in the reorganization proceedings of this company.

BALTIMORE & OHIO.—*Equipment Trust Certificates.*—The Interstate Commerce Commission, Division 4, has authorized this company to assume liability for $7,500,000 of 2½ per cent equipment trust certificates, maturing in 10 equal annual installments on March 1, from 1938 to 1947. The issue has been sold to a group composed of Salomon Brothers & Hutzler, Dick & Merle-Smith, and Stroud & Co., Inc., at 96.788, making the average annual cost to the company approximately 3.155 per cent.

BOSTON & MAINE.—*Annual Report.*—The 1936 annual report of this company shows net deficit, after interest and other charges, of $1,654,182, a decrease of $1,860,946, as compared with the 1935 figure. Selected items from the income account follow:

	1936	Compared with 1935 Increase or Decrease
Average Mileage Operated	1,975.66	−21.57
RAILWAY OPERATING REVENUES	$46,518,158	+$2,897,110
Maintenance of way	6,910,059	+1,731,323
Maintenance of equipment	7,418,581	+821,600
Transportation	18,620,066	+802,997
TOTAL OPERATING EXPENSES	36,003,612	+3,454,337
Operating ratio	77.40	+2.79
NET REVENUE FROM OPERATIONS	10,514,546	−557,226
Railway tax accruals	3,336,095	910,672
Railway operating income	7,178,450	−1,467,898
Equipment and joint facility rents—Net Dr.	2,325,264	+296,832
NET RAILWAY OPERATING INCOME	4,853,186	−1,764,731
Non-operating income	1,128,931	−23,304
TOTAL INCOME	5,982,118	−1,788,035
Rent for leased roads	1,242,532	+170
Interest on funded debt*	5,630,817	+70,153
TOTAL FIXED CHARGES	7,552,800	+62,875
NET INCOME (Deficit)	1,654,182	−1,860,946

* Interest amounting to $190,666.25 for 1936 and $177,005.39 for 1935 accrued on bonds of Boston & Maine Railroad held in Sinking Fund is included in account "Income Applied to Sinking Funds".

CENTRAL R. R. OF NEW JERSEY.—*Annual Report.*—The annual report of this company for the year 1936 shows net loss, after interest and other charges, of $2,983,240, as compared with net loss of $2,346,737 in 1935. Selected items from the income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	681.20	681.20	.....
RAILWAY OPERATING REVENUES	$31,799,356	$29,514,458	+$2,284,897
Maintenance of way	2,437,020	1,991,273	+445,746
Maintenance of equipment	6,034,652	5,489,603	+545,049
Transportation—Rail	13,000,740	12,195,973	+804,766
TOTAL OPERATING EXPENSES	23,608,786	21,462,672	+2,146,113
Operating ratio	74.24	72.70	+1.54
NET REVENUE FROM OPERATIONS	8,190,570	8,051,786	+138,784
Railway tax accruals	4,976,122	4,431,875	+544,246
Hire of equipment	1,594,911	1,330,002	+264,909
Joint facility rents	55,532	97,215	−41,682
NET RAILWAY OPERATING INCOME	1,564,003	2,192,692	−628,689
Non-operating income	1,021,655	1,039,987	−18,331
GROSS INCOME	2,585,659	3,232,680	−647,021
Deductions for Rentals	2,729,694	2,716,999	+12,695
Deductions for Interest	2,512,761	2,552,228	−39,467
TOTAL DEDUCTIONS FROM GROSS INCOME	5,568,899	5,579,418	−10,518
NET LOSS	$2,983,240	$2,346,737	+$636,502

DENVER & RIO GRANDE WESTERN.—*Acquisition.*—The Rio Grande Motor Way has applied to the Interstate Commerce Commission for authority to purchase the Colman Freight Service, operating in Colorado as a common carrier by motor truck.

DELAWARE & HUDSON.—*Annual Report.*—The annual report of this road for 1936 shows net deficit, after interest and other charges, of $926,695, as compared with net deficit of $2,774,976 in 1935, a decrease of $1,848,281. Selected items from the income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	847.30	851.51	−4.21
RAILWAY OPERATING REVENUES	$25,375,850	$22,883,760	+$2,492,089
Maintenance of way	3,266,264	3,407,719	−141,455
Maintenance of equipment	6,021,003	6,210,299	−189,296
Transportation	9,219,620	8,909,075	+310,545
TOTAL OPERATING EXPENSES	20,641,763	20,555,726	+86,037
Operating ratio	81.34	89.83	−8.49
NET REVENUE FROM OPERATIONS	4,734,086	2,328,034	+2,406,051
Railway tax accruals	1,661,615	1,080,537	+581,077
Railway operating income	3,072,471	1,247,496	+1,824,974
Hire of Freight Cars—Cr.	144,510	176,733	−32,222
Joint facility rents—Net	154,222	155,042	−820
NET RAILWAY OPERATING INCOME	3,132,603	1,328,691	+1,803,911
Non-operating income	198,215	190,034	+8,180
GROSS INCOME	3,330,819	1,518,726	+1,812,092
Rent for leased roads	1,786,261	1,786,261	.....
Interest on funded debt	2,417,500	2,449,837	−32,337
TOTAL DEDUCTIONS FROM GROSS INCOME	4,238,274	4,269,525	−31,251
NET INCOME DEFICIT	$926,695	$2,774,976	−$1,848,281

GULF, MOBILE & NORTHERN.—*Annual Report.*—The 1936 annual report of this company shows net income, after interest and other charges, of $706,552, as compared with net income of $404,710 in 1935. Selected items from the income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	936.17	936.17	.....
RAILWAY OPERATING REVENUES	$7,292,909	$6,170,896	+$1,122,013
Maintenance of way	723,049	767,960	−44,911
Maintenance of equipment	1,035,404	936,752	+98,651
Transportation	1,914,784	1,760,656	+154,127
TOTAL OPERATING EXPENSES	4,468,593	4,089,420	+379,173
Operating ratio	66.24	61.27	+4.97
NET REVENUE FROM OPERATIONS	2,824,315	2,081,476	+742,839
Railway tax accruals	650,779	377,216	+273,563
Equipment rents—Net	459,808	324,060	+135,747
Joint facility rents—Net	301,124	279,256	+21,867
NET RAILWAY OPERATING INCOME	1,412,604	1,100,942	+311,661
Non-operating income	130,504	111,016	+19,488
GROSS INCOME	1,543,108	1,211,959	+331,149
Rent for leased roads and equipment	263,400	263,400	.....
Interest on funded debt	562,302	528,564	+33,738
TOTAL DEDUCTIONS FROM GROSS INCOME	836,555	807,249	+29,306
NET INCOME	$706,552	$404,710	+$301,842

GULF COAST LINES.—*Trustees.*—Ap-

Continued on next left-hand page

❶ Superheat increases boiler capacity

❷ The loss of superheat decreases boiler capacity

❸ Moisture-saturated steam entering the superheater units decreases superheat

❹ The Elesco Tangential Steam Dryer separates moisture from the steam entering the superheater

❺ The Elesco Tangential Steam Dryer increases boiler capacity

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pointment of a separate trustee for the Gulf Coast Lines, of the Missouri Pacific System, has been proposed in two petitions filed in the federal district court at St. Louis, Mo., by the Irving Trust Company, representing first mortgage bondholders of the Gulf Coast Lines, and the chairman of the bondholders protective committee, representing the first mortgage and income bonds of the line. A hearing has been set for April 23.

ILLINOIS CENTRAL-CHICAGO.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized the Chicago, St. Louis & New Orleans to abandon a part of a branch line extending from Clay, Ky., to Dixon, 10.4 miles, and the Illinois Central to abandon operation of this branch.

INDIANAPOLIS UNION.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $3,150,000 of 3½ per cent refunding and improvement mortgage bonds, series B, maturing on March 1, 1986. The Pennsylvania, New York Central and the Cleveland, Cincinnati, Chicago & St. Louis have asked the commission for authority to assume liability as guarantors for the bonds. Halsey, Stuart & Co. and associated firms have made a public offering of the bonds priced at 99.

KANSAS CITY SOUTHERN.—*Annual Report.*—The 1936 annual report of this road shows net income, after interest and other charges, of $580,375, as compared with net deficit of $955,730 in 1935. Selected items from the income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	878.78	878.78	.....
RAILWAY OPERATING REVENUES	$13,831,777	$9,977,713	+$3,854,063
Maintenance of way	1,219,844	987,963	+231,880
Maintenance of equipment	2,281,604	1,713,080	+568,524
Transportation	3,822,876	3,159,741	+663,135
TOTAL OPERATING EXPENSES	8,726,243	7,205,687	+1,520,556
Operating ratio	71.31	80.00	–8.69
NET REVENUE FROM OPERATIONS	5,105,534	2,772,026	$2,333,507
Railway operating income	3,968,534	1,995,141	+1,973,393
Equipment rents—Net Dr.	731,381	419,157	+312,223
Joint facility rents—Net Dr.	103,861	89,580	+14,280
NET RAILWAY OPERATING INCOME	3,133,291	1,486,403	+1,646,888
Non-operating income	365,061	440,742	–75,681
GROSS INCOME	3,498,353	1,927,145	+1,571,208
Rent for leased roads	168,097	167,921	+176
Interest on funded debt	2,665,090	2,686,560	–21,470
TOTAL FIXED CHARGES	2,880,293	2,848,058	32,235
NET INCOME	$580,375	$955,730*	+$1,536,105

* Deficit.

LEHIGH & HUDSON RIVER.—*Annual Statement.*—The annual statement of this company for the year 1936 shows net income of $223,491, after interest and other charges, as compared with net income of $223,813 in 1935. Selected items from the income account follow:

	1936	1935	Increase or Decrease
RAILWAY OPERATING REVENUES	$1,566,897	$1,493,249	+$73,648
Maintenance of way	161,703	152,105	+9,597
Maintenance of equipment	220,685	228,417	–7,731
Transportation	563,826	516,365	+47,461
TOTAL OPERATING EXPENSES	1,077,215	1,013,308	+63,907
Operating ratio	68.7	67.9	+0.8
NET REVENUE FROM OPERATIONS	489,681	479,940	+9,740
Railway tax accruals	157,316	133,421	+23,894
Hire of Equipment	88,434	91,347	–2,912
Joint facility rents	56,398	62,375	–5,977
NET RAILWAY OPERATING INCOME	187,532	192,796	–5,263
Non-operating income	36,577	31,600	+4,976
GROSS INCOME	224,110	224,396	–286
TOTAL DEDUCTIONS FROM GROSS INCOME	618	582	+35
NET INCOME	$223,491	$223,813	–$321

CONCHO, SAN SABA & LLANO VALLEY.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized this company and the Gulf Colorado & Santa Fe to abandon a line extending from Miles, Texas, to Paint Rock, 16.74 miles.

LOUISIANA & ARKANSAS.—*Leave to Intervene.*—The Interstate Commerce Commission, Division 4, has authorized Berryman Henwood, trustee of the St. Louis Southwestern, Guy A. Thompson, trustee of the Missouri Pacific and New Orleans, Texas & Mexico, to intervene in the case of the application of this company to purchase the Rock Island, Arkansas & Louisiana.

NEW YORK, NEW HAVEN & HARTFORD.—*Abandonment.*—The trustees have applied to the Interstate Commerce Commission for authority to abandon the following lines: From Silvernails Station, N. Y., to a point at the junction of the line between Ancramdale and Stissing Junction, 3.38 miles; from Ancramdale Station, N. Y., to a point at the junction of the line from Pine Plains to Stissing Junction, 5.05 miles; from Pine Plains, N. Y., to N. D. & C. Junction, .69 mile; from N. C. & C. Junction to Poughkeepsie Junction, 24.8 miles; and from State Line, N. Y., to Millerton, 1.86 miles.

NORFOLK SOUTHERN.—*Right to Operate Bus Line.*—The Interstate Commerce Commission, Division 5, has found that the Norfolk Southern Bus Corporation is entitled to continue operation as a common carrier of passengers by bus between certain points in Virginia; between Norfolk, Va., and Elizabeth City, N. C.; between Elizabeth City and Washington, N. C.; and between Williamston, N. C., and Columbia. The commission has also authorized this company to conduct charter operations from its territory to any point in the United States and to carry mail in its motor coaches. Joint Board No. 7, in a proposed report to the Interstate Commerce Commission, has recommended that the commission grant authority to the Bus Corporation to continue operation by motor coach between Norfolk, Va., and Knotts Island, N. C.; but has recommended that it deny the company the right to establish a bus route between Norfolk, Va., and New Bern, N. C.

NEW YORK, NEW HAVEN & HARTFORD.—*Preliminary Statement.*—The preliminary report of this company for the year ended December 31, 1936, shows net deficit after fixed charges of $3,580,044, an increase of $19,575 over 1935. Passenger revenue showed an increase of $2,887,931, or 13.1 per cent, over the preceding year, while freight revenue increased $4,025,914, or 9.9 per cent. Total operating revenues for 1936 amounted to $78,867,149, an increase of $7,775,812, or 10.9 per cent, over the year 1935 and the highest for any year since 1931. Total operating expenses were $58,414,779, an increase of $6,000,356, or 11.4 per cent over 1935.

PENNSYLVANIA.—*Annual Report.*—The 1936 annual report of this company shows net income, after interest and other charges, of $38,742,091, an increase of $14,779,505 over net income for 1935. Selected items from the income statement follow:

	1936	Compared with 1935 Increase or Decrease
Average Mileage Operated	10,310.97	–131.77
RAILWAY OPERATING REVENUES	$441,425,189	+$73,613,003
Maintenance of way	39,496,697	+6,946,001
Maintenance of equipment	92,204,366	+22,113,586
Transportation	151,976,099	+20,182,620
TOTAL OPERATING EXPENSES	314,087,700	+50,987,516
Operating ratio	71.2	–0.3
NET REVENUE FROM OPERATIONS	127,337,488	+22,625,486
Railway tax accruals	34,714,148	+9,479,723
Railway operating income	92,623,339	+13,296,084
Hire of Equipment—Dr.	5,859,161	–1,172,734
Joint facility rents—Dr.	2,583,584	+682,866
NET RAILWAY OPERATING INCOME	84,180,593	13,785,952
Non-operating income	36,119,533	–406,677
GROSS INCOME	120,300,126	+13,379,274
Rent for leased roads	51,291,309	+182,383
Interest on funded debt	28,017,364	–2,018,937
TOTAL DEDUCTIONS FROM GROSS INCOME	81,558,035	–1,400,230
NET INCOME	$38,742,091	+$14,779,505

PENNSYLVANIA.—*Truck Line Acquisition.*—The Interstate Commerce Commission, Division 5, has authorized the Pennsylvania Truck Lines, Inc., to purchase the Chicago-Cincinnati Motor Freight Lines and the Alko Express Lines.

PERE MARQUETTE.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to assume liability for $1,940,000 of 2¾ per cent equipment trust certificates, maturing in 10 equal annual installments on May 1, from 1938 to 1947.

RUTLAND.—*Annual Report.*—The 1936 annual report of this road shows net defi-

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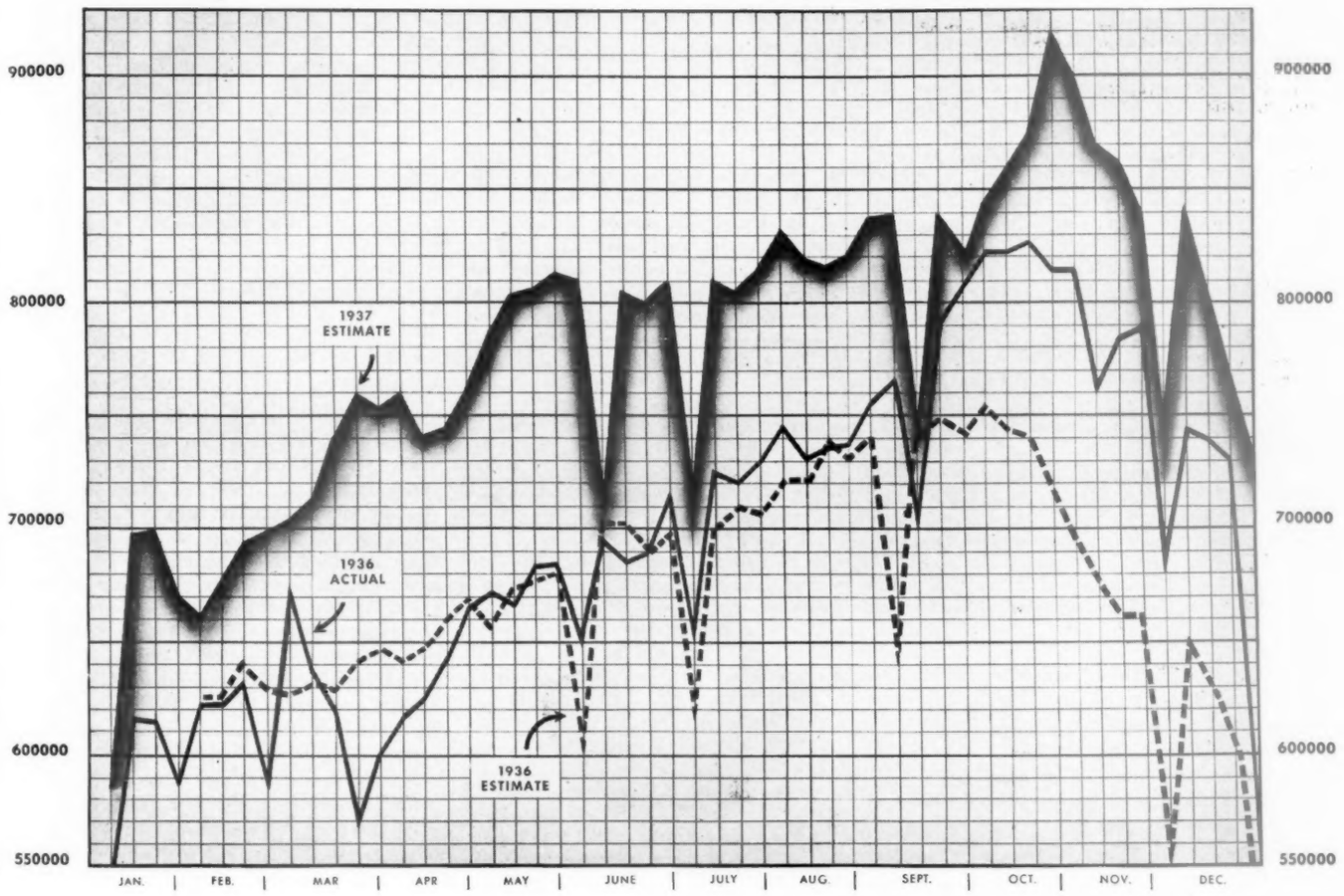
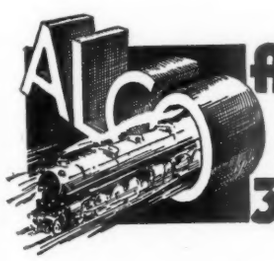
Still "Going Up!"



WEEKLY FREIGHT CAR LOADINGS
ESTIMATE AND ACTUAL FOR 1936
ESTIMATE FOR 1937

Both estimates were made by
JOHN L. KERR
An Expert Statistician



AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET · NEW YORK · N·Y

cit, after interest and other charges, of $241,374, as compared with net deficit of $482,982 in 1935. Selected items from the income account follow:

	1936	1935	Increase or Decrease
Average Mileage Operated	407.29	407.29	.....
Railway Operating Revenues	$3,465,869	$3,213,264	+$252,604
Maintenance of way	491,129	534,139	−43,010
Maintenance of equipment	682,269	662,648	+19,621
Transportation	1,671,150	1,625,835	+45,315
Total Operating Expenses	3,141,741	3,127,879	+13,862
Operating ratio	90.65	97.34	−6.69
Net Revenue from Operations	324,128	†85,385	+238,742
Railway tax accruals	223,039	235,865	−12,825
Railway operating income	101,088	150,479*	+251,567
Equipment rents —Net Dr.	29,335	14,329	+15,005
Joint facility rents—Net Cr.	27,751	26,327	+1,423
Net Railway Operating Income	99,504	138,481*	+237,985
Non-operating income	76,180	75,093	+1,086
Gross Income	175,684	63,388*	+239,072
Rent for leased roads and equipment	15,000	15,000	.....
Interest on funded debt	395,490	398,240	−2,749
Total Deductions from Gross Income	417,059	419,594	−2,534
Net Deficit	$241,374	$482,982	−$241,607

* Deficit.
† Revised for purposes of comparison.

St. Louis-San Francisco.—*Reorganization.*—The Interstate Commerce Commission, Division 4, has refused to approve the debtor's plan of reorganization for this company, and has continued the case for further hearings.

St. Louis-San Francisco.—*Reorganization.*—The Interstate Commerce Commission, Division 4, has ordered that J. M. Kurn be paid a yearly salary of $30,000 as co-trustee of this company, but that he receive no compensation as an officer or employee of the company or any of its subsidiaries.

Southern Pacific.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized this company to abandon a part of its Yaquina branch extending from Altree, Ore., to Yaquina, 7.26 miles.

Wabash.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized this company and Norman B. Pitcairn and Frank C. Nicodemus, Jr., its receivers, to abandon a part of its Bement branch extending from Stewardson, Ill., to Effingham, 13 miles.

Dividends Declared

Atlantic Coast Line.—5 Per Cent Preferred, $2.50, semi-annually, payable May 10 to holders of record April 23.

Average Prices of Stocks and Bonds

	Mar. 30	Last week	Last year
Average price of 20 representative railway stocks..	59.68	58.71	47.50
Average price of 20 representative railway bonds..	83.05	82.21	80.28

Railway Officers

EXECUTIVE

C. B. McManus, traffic manager of the New York, Ontario & Western, with headquarters at New York, has been elected vice-president.

LeRoy V. Porter, comptroller of the New York Central System, with headquarters at New York, has been appointed assistant vice-president and comptroller, with the same headquarters. Mr. Porter was born on September 11, 1876, at Hopkins, Mich. Educated in the high school at Plainwell, Mich., he entered railway service on September 21, 1896, as station agent and telegraph operator of the Indiana, Illinois & Iowa (now part of the New York Central). He served in this capacity until November, 1901, when he was appointed traveling auditor and

LeRoy V. Porter

general bookkeeper of the same road. In May, 1906, he went to the Lake Shore & Michigan Southern (now N. Y. C.) as general clerk at Cleveland, Ohio, and in August, 1909, he became chief clerk to the auditor of the same road at the same place. In January, 1910, he was appointed assistant auditor of the L. S. & M. S. at Cleveland, a position which he held until October, 1914, when he became chief clerk to the vice-president of the accounting department of the New York Central. In July, 1918, he was appointed assistant comptroller of the same lines and in February, 1930, his appointment as comptroller became effective.

FINANCIAL, LEGAL AND ACCOUNTING

Edward A. Clancy, assistant to the comptroller of the New York Central, has been appointed assistant comptroller of this system, with headquarters at New York. He first entered service with the N. Y. C. financial department in 1903, but in 1913 he left to serve as accountant with the Public Service Commission of New York and the Interstate Commerce Commission. Resuming his post with the New York Central in 1918, Mr. Clancy became assistant to the comptroller in 1925, con-

Edward A. Clancy

tinuing in that capacity until his present appointment as assistant comptroller.

John Lummis, assistant auditor of freight and telegraph receipts of the Canadian Pacific, has been appointed auditor of freight and telegraph receipts, with headquarters at Montreal, Que., succeeding the late **E. H. Bridger. E. F. Lawson,** central freight accounting agent, has been appointed assistant auditor of freight and telegraph receipts, with headquarters as before at Montreal. Mr. Lummis was born on September 21, 1876, at Montreal and attended the public schools in that city. He entered the service of the Canadian Pacific in August, 1893, as clerk in the office of the auditor of freight and telegraph receipts at Montreal and became chief clerk, interline accounts, on June 1, 1915. On June 1, 1916, he was appointed head interline clerk and acting chief clerk on July 16, 1927. Mr. Lummis was appointed assistant auditor of freight and

John Lummis

telegraph receipts on January 1, 1933, the position he held until his recent appointment.

OPERATING

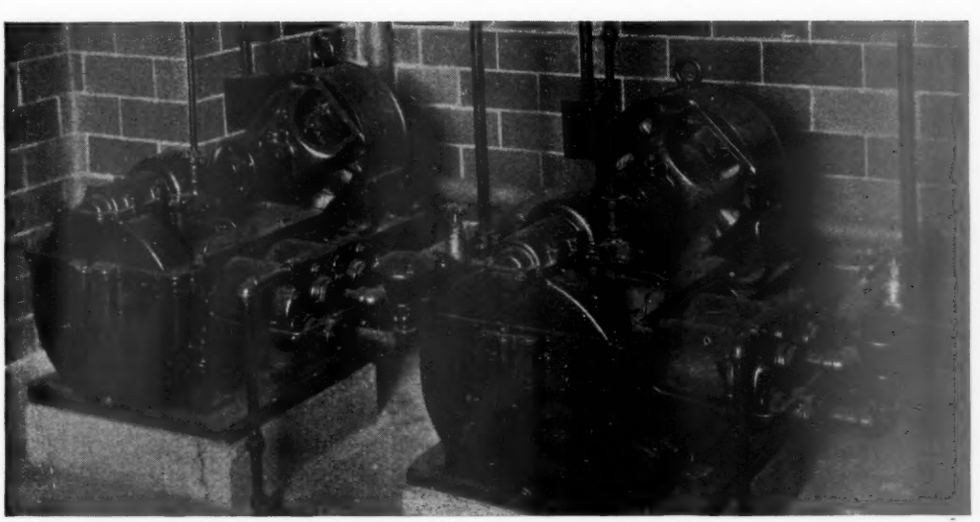
R. S. Lockhart has been appointed superintendent stations and transfers of the Seaboard Air Line, with headquarters at

Continued on next left-hand page

For Every Pneumatic Need

NOT only on locomotives for brake operation, but in shops for pneumatic tools — in power houses for cleaning purposes — in yards for train charging and car retarders — in signal towers for switch operation — in wood preserving plants for the high pressure method of tie treating — compressed air is being supplied by Westinghouse compressors. . . They are compact, efficient, reliable, and durable — characteristics that distinguish Westinghouse apparatus.

WESTINGHOUSE AIR BRAKE COMPANY
General Office and Works - - - Wilmerding, Penna.



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WESTINGHOUSE AIR COMPRESSORS

Norfolk, Va., succeeding **E. Y. Graves,** transferred.

G. H. Caley, electrical and signal engineer of the New York, Ontario & Western, with headquarters at Middletown, N. Y., has been appointed general manager.

P. D. Bridges, assistant superintendent on the Gulf, Mobile & Northern with headquarters at Jackson, Miss., and **L. M. Rucker,** assistant superintendent at New Albany, Miss., have had their titles changed to superintendent.

C. L. Bakke, whose appointment as superintendent of the Des Moines division of the Chicago, Rock Island & Pacific with headquarters at Des Moines, Iowa, was reported in the *Railway Age* of March 6, was born at Mayville, N. D., and entered railway service with the Chicago, Burlington & Quincy in April, 1910,

C. L. Bakke

in engine service. Later he was transferred to train service as a brakeman, being promoted to conductor in 1915. During the war Mr. Bakke served with the Fifteenth Engineers in France. Returning from army service, he was appointed yardmaster on the Burlington at Sterling, Ill., later being transferred to Chicago, where he was appointed assistant trainmaster in 1922. In February, 1925, he was further advanced to trainmaster of the Ottumwa division, serving in this capacity on various divisions until October 12, 1936, when he accepted a position with the Rock Island as terminal trainmaster at Peoria. On February 4, 1937, he was promoted to assistant superintendent of the Des Moines division, which position he held until his appointment as superintendent of the same division on March 1.

TRAFFIC

A. L. Wynn has been appointed assistant general claim agent of the Chicago & North Western, with headquarters at Chicago.

F. A. Kilker has been appointed assistant freight claim agent of the Chicago, Burlington & Quincy, with headquarters at Chicago.

O. N. Spain, general passenger agent of the Chesapeake & Ohio, with headquarters at Washington, D. C., has been transferred to Richmond, Va., reporting to the passenger traffic manager.

William A. Huse, assistant general freight agent of the Norfolk & Western, with headquarters at Roanoke, Va., has been appointed assistant freight traffic manager, with the same headquarters. **F. S. Baird,** assistant general freight agent, with headquarters at Roanoke, has been promoted, with the same title, to the position held formerly by Mr. Huse. **C. F. Keeley,** assistant general freight agent at Roanoke, has been promoted, with the same title, to the position held formerly by Mr. Baird. **H. G. Rardin,** commerce agent, has been appointed assistant general freight agent at Roanoke, succeeding Mr. Keeley.

Ernest C. Ash, general freight agent of the Alabama, Tennessee & Northern, whose appointment as assistant traffic manager with headquarters at Mobile, Ala., was reported in the *Railway Age* of March 13, was born on May 31, 1896, at Mobile. Following a public school education, he entered railway service in July, 1913, in the accounting department of the Gulf, Mobile & Northern. Four years later he was transferred to the traffic department as a rate clerk, and in March, 1920, he left this company to go with the Mobile & Ohio as chief clerk in the traffic department. In October, 1920, Mr. Ash accepted a similar position with the Alabama, Tennessee & Northern, in which capacity he remained until November, 1924, when he was advanced to assistant general freight agent. In November, 1926, he was further promoted to general freight agent, which position he was holding at the time of his recent appointment as assistant traffic manager.

Andrew D. Houston, who has been appointed assistant to the freight traffic manager of the New York, Chicago & St. Louis (Nickel Plate), with headquarters at Cleveland, Ohio, as reported in the *Railway Age* of March 13, was born on

A. D. Houston

April 16, 1896, at Lowellville, Ohio. He first entered railway service with the Baltimore & Ohio in September, 1920, as secretary to the assistant general freight agent at Cleveland, Ohio. Two years later he left this company to go with the Nickel Plate as secretary to the general freight agent at Cleveland, later serving as rate quotation clerk, clerk in the general freight office, and chief rate clerk at the same point. On May 1, 1926, Mr. Houston was sent to Erie, Pa., as a freight representative and on September 1, 1927, he was appointed traveling freight agent with headquarters at Columbus, Ohio, being transferred to New York on October 16, 1929. On November 1, 1930, he was appointed westbound agent at New York, and on July 16, 1931, he was sent to Columbus, Ohio, as general agent. His appointment to the position of assistant to the freight traffic manager at Cleveland became effective on March 1.

Henry F. McCarthy, general passenger agent of the Boston & Maine and the Maine Central, with headquarters at Bos-

Henry F. McCarthy

ton, Mass., has been appointed passenger traffic manager of these roads and also traffic manager of the Boston-Maine Airways, succeeding **Walton O. Wright,** deceased. Mr. McCarthy's appointment became effective April 1. **Frederick T. Grant,** general passenger agent of the Boston & Maine, has been appointed also general passenger agent of the Maine Central, effective April 1. Mr. McCarthy was born at Portsmouth, N. H., in 1906, was educated in the public schools of that city, and was graduated from Harvard University in 1927. Shortly afterward he became associated with the Baltimore & Ohio, resigning in 1929 to continue his education. After completion of studies at Yale University, he became connected with the St. Louis Southwestern, serving as assistant general traffic manager. Mr. McCarthy resigned from the latter position in 1934, to become general passenger agent of the Boston & Maine and the Maine Central, which position he held until his recent appointment.

ENGINEERING AND SIGNALING

S. R. Sproles, track supervisor on the Gulf, Mobile & Northern with headquarters at Mobile, Ala., has been promoted to the newly-created position of principal assistant engineer with the same headquarters. **H. M. Gully,** resident engineer at

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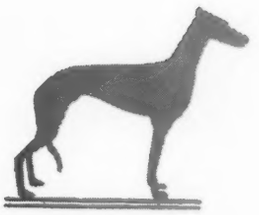
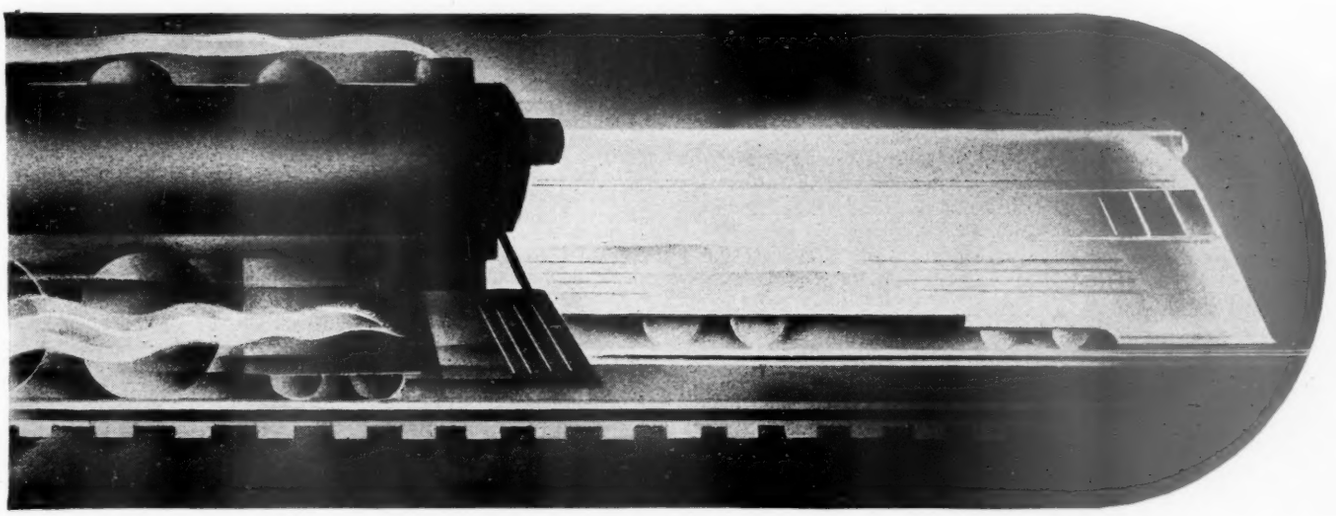
THE BULLDOG..

BECOMES A GREYHOUND





...BUT THE GREYHOUND'S JUST AS TOUGH!

On fast runs the lumbering locomotive gives way to lithe streamlined engines that cover the distance in far less time...Improved design contributes something to this speeding up of transportation, but far more important is the elimination of useless weight...Through the use of modern alloys possessing toughness combined with a high strength-weight ratio, rolling stock of every type is being made lighter without reduction in the factor of safety...Among the chief contributors to these improvements are the Nickel Alloy Steels, of which stainless steel is a popular type. For through a partnership with Nickel these steels are rendered tougher and stronger than the simple steels — more highly resistant to shock, stress, fatigue, corrosion, abrasion and wear. Perhaps you have a particular job (not necessarily connected with transportation) where the elimination of useless weight will effect worthwhile savings in operating and upkeep costs. We invite consultation. Nickel Alloy Steels, Nickel Cast Irons, or other alloys containing Nickel may be the answer.

NICKEL ALLOY STEELS

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

Union, Miss., has been appointed to the newly-created position of roadmaster with the same headquarters, with jurisdiction over the entire system.

A. H. Rudd, chief signal engineer of the Pennsylvania, with headquarters in Philadelphia, Pa., retired at the age of 70, on March 31, as noted elsewhere in this issue. **H. L. Stanton,** superintendent of telegraph and signals, Eastern Region, with headquarters in Philadelphia, has been promoted to assistant chief engineer-signals, in the office of W. D. Wiggins, chief engineer. **W. M. Post,** assistant chief signal engineer, with headquarters in Philadelphia, has been appointed signal engineer, with the same headquarters. **C. W. Hixson,** superintendent of telegraph and signals, Western Region, with headquarters in Chicago, has been transferred to Philadelphia to succeed Mr. Stanton as superintendent of telegraph and signals, Eastern Region. **R. F. Raughley,** assistant superintendent of telegraph and signals, Eastern Region, with headquarters, in Philadelphia, has been promoted to superintendent of telegraph and signals, Western Region, to succeed Mr. Hixson.

OBITUARY

B. B. Cleaton, assistant division master mechanic of the Louisville & Nashville, with headquarters at Loyall, Ky., died on March 25.

Norfolk and Western Railway Company
Forty-First Annual Report

Roanoke, Va., March 29, 1937.

The Annual Report for the year ended December 31, 1936, has been approved by the Board of Directors for submission to the stockholders. A synopsis follows:

Comparison of 1936 results with those of 1935:

	1936	1935	Increase or Decrease
Revenue from Freight	$89,903,067.29	$73,661,074.79	I. $16,241,992.50
Revenue from Passengers	2,220,260.39	1,841,601.75	I. 378,658.64
Revenue from Mail, Express and Miscellaneous	2,740,965.86	2,541,707.84	I. 199,258.02
Total Revenue from Operations	$94,864,293.54	$78,044,384.38	I. $16,819,909.16
Maintenance of Way and Structures	$11,160,263.34	$8,577,223.51	I. $2,583,039.83
Maintenance of Equipment	15,056,035.54	14,411,433.09	I. 644,602.45
Transportation—Expense of Operation	20,074,242.07	17,949,958.69	I. 2,124,283.38
Other Expenses	3,857,357.93	3,560,549.67	I. 296,808.26
Total Operating Expenses	$50,147,898.88	$44,499,164.96	I. $5,648,733.92
Net Revenue From Operations	$44,716,394.66	$33,545,219.42	I. $11,171,175.24
Ratio of Operating Expenses to Total Operating Revenue	52.86%	57.02%	D. 4.16%
Federal, State and Local Taxes	$13,734,848.71	$8,840,000.00	I. $4,894,848.71
Uncollectible Revenue Charges	.....	7,105.29	D. 7,105.29
Net Rental of Equipment and Joint Facilities—Credit	3,523,878.17	2,605,703.44	I. 918,174.73
Net Railway Operating Income	$34,505,424.12	$27,303,817.57	I. $7,201,606.55
Other Income—(Mainly Interest on Investments)	896,104.49	1,332,694.79	D. 436,590.30
Gross Income from all sources	$35,401,528.61	$28,636,512.36	I. $6,765,016.25
Interest Paid on Bonds	$2,145,767.39	$2,839,913.84	D. $694,146.45
Miscellaneous Deductions	346,236.25	440,746.47	D. 94,510.22
Net Income	$32,909,524.97	$25,355,852.05	I. $7,553,672.92
Dividends on Adjustment Preferred Stock—$4.00 per share	$919,692.00	$919,692.00	.....
Extra Dividend on Common Stock—$2.00 per share	.....	2,812,966.00	D. $2,812,966.00
Income Balance	$31,989,832.97	$21,623,194.05	I. $10,366,638.92
Dividends on Common Stock—$13.00 per share for 1936—$10.00 per share for 1935	$18,284,279.00	$14,064,830.00	I. $4,219,449.00
Funded Debt outstanding at end of year	52,139,531.92	52,139,531.92	.....
Capital Stock outstanding at end of year	163,640,600.00	163,640,600.00	.....
Investment in Road and Equipment at end of year	468,588,684.79	456,405,352.93	I. $12,183,331.86

Gross Railway Operating Revenues for 1936 were $94,864,293.54, an increase over 1935 of $16,819,909.16, or 21.55 per cent., due to general business improvement. Operating Expenses were $50,147,898.88, an increase of $5,648,733.92, or 12.69 per cent. Maintenance of Way and Structures increased, due principally to important repairs to roadbed and flood rehabilitation in the Spring of 1936, while Maintenance of Equipment increased slightly because of heavy repairs to equipment. Transportation Expenses increased chiefly because of greater volume of business during the year, and General Expenses indicated an increase due to a credit adjustment in 1935 after the Railroad Retirement Act of 1934 was declared unconstitutional. All expenses in 1936 reflect advanced costs of fuel and material and supplies, also larger payrolls due to greater number of employees.

Net Revenue from Operations were $44,716,394.66, an increase of $11,171,175.24, or 33.30 per cent. Income Balance, after paying the regular 4 per cent. dividend of $919,692.00 upon the Adjustment Preferred Stock, was $31,989,832.97, an increase of $10,366,638.92, or 47.94 per cent. It should be noted, however, that in 1935 an extra dividend upon the Common Stock, amounting to $2,812,966.00, was charged against the earnings for the year, while in 1936 the extra dividend was a charge to Surplus. Quarterly dividends of $2.00 per share, and an extra dividend of $5.00 per share, a total of $13.00, were paid upon the Common Stock and charged to Surplus. This compared with a total of $10.00 for 1935, of which $2.00 per share was an extra dividend paid March 19, 1936, and charged against 1935 earnings.

Emergency freight rates, from which the Company received $4,026,585.61 during the year, were discontinued on December 31, 1936, by order of the Interstate Commerce Commission. For the purpose of replacing revenues lost because of discontinued emergency freight rates, the carriers have petitioned the Commission for an adjustment of basic freight rates.

Comparison of traffic and operating revenue figures with those for 1935 shows the following changes:

Number of passengers	1,693,434	increased	262,394	18.34 per cent
Average haul of passengers	64.13 miles	decreased	.98 miles	1.51 " "
Revenue from passenger fares	$2,220,260.39	increased	$378,658.64	20.56 " "
Average rate per passenger per mile	2.044 cents	increased	.067 cents	3.39 " "
Revenue freight carried	49,193,930 tons	increased	9,848,688 tons	25.03 " "
Average haul of freight	274.67 miles	decreased	3.96 miles	1.42 " "
Revenue from freight transportation	$89,903,067.29	increased	$16,241,992.50	22.05 " "
Average rate per ton per mile	665 cents	decreased	.007 cents	1.04 " "
Average tons of revenue freight per train mile	1,675.72	increased	134.53 tons	8.73 " "
Shipments of coal	39,655,390 tons	increased	8,076,764 tons	25.58 " "
Shipments of coke	543,902 tons	increased	50,115 tons	10.15 " "
Shipments of ore	389,994 tons	increased	48,694 tons	14.27 " "
Shipments of pig and bloom iron	22,000 tons	increased	7,155 tons	48.20 " "
Shipments of lumber	763,960 tons	increased	169,516 tons	28.52 " "

The following comparison of Operating Revenues by quarters indicates the unexpected contra-seasonal increases in revenues in the final quarter of the year:

Operating Revenues:	*Jan.-Mar.*	*Apr.-June*	*July-Sept.*	*Oct.-Dec.*
Freight	$19,969,231.71	$20,490,663.74	$23,235,323.01	$26,207,848.83
Passenger, Mail and Express	858,709.70	1,001,785.91	1,049,431.58	1,103,487.26
Other	246,600.95	240,097.45	211,628.07	249,485.33
Totals	$21,074,542.36	$21,732,547.10	$24,496,382.66	$27,560,821.42

There was no change in the outstanding Capital Stock, which

[Advertisement]

represented 75.84 per cent. of total outstanding capitalization.

Funded Debt remained unchanged and represented 24.16 per cent. of total outstanding capitalization.

The Norfolk and Western Railway Company and Pocahontas Coal and Coke Company, a subsidiary, co-makers of Pocahontas Coal Lands Purchase Money First Mortgage 4 per cent. Bonds, due December 1, 1941, called for redemption and payment on December 1, 1936, $10,130,000 of said bonds at 105 and accrued interest. Out of the original issue of $20,000,000, there had been retired through operation of the sinking fund $9,870,000 of bonds.

The investment in property used in transportation service was $335,874,436.44, an increase of $7,436,702.21, due principally to the acquisition of the lines of railroad of subsidiaries in Pike and Martin Counties, Kentucky, aggregating 26.70 miles of main line and 30.73 miles of sidings and yard tracks. These lines furnish transportation facilities to valuable coal deposits in Pike and Martin Counties, Kentucky, and in Buchanan County, Va., and are now operated as spur tracks from junction points with the Company's main line in West Virginia. The acquisition of these subsidiaries and their subsequent dissolution necessitated the domestication of the Company in the State of Kentucky, with authority to operate lines of railway in that State, which was accomplished April 1, 1936.

The investment in equipment owned was $132,714,248.35, an increase of $4,746,629.65. During the year the Company built, in its Roanoke Shops, 7 steam freight locomotives, 475 all-steel hopper cars, 57½ tons capacity, and 1000 all-steel hopper cars, 55 tons capacity, and rebuilt 2 spreader cars. It purchased 1000 all-steel hopper cars, 55 tons capacity, 184 all-steel box cars, 50 tons capacity, and 8 units of miscellaneous equipment, and retired 25 steam locomotives, 599 freight train cars and 74 work equipment cars, chiefly because of obsolescence. 22 passenger coaches were reconditioned and air-conditioning apparatus installed, making a total of 63 air-conditioned cars in service at the close of the year, thus providing modernized equipment for principal passenger trains. The Company's equipment at the end of the year consisted of 568 steam locomotives, 16 electric locomotives, 313 passenger train cars, 47,900 freight train cars and 1,828 work and miscellaneous units.

In line with the general trend, the Company inaugurated free collection and delivery service for the handling of less-than-carload shipments at fifty of the more important points upon the Company's lines. Through this service it is hoped to regain a portion of the traffic which has been diverted to motor trucks and to prevent further loss of such business.

The more important additions and betterments consisted of completion and placing in operation in Buchanan County, Va., of Extension of Buchanan Branch, a distance of 14.77 miles, of Dismal Creek Branch, 23.19 miles in length, of Hanger Spur, 1.88 miles in length, and Long Spur, 2.51 miles in length; laying 202.53 miles of track with the heavier 131 lb. rail; placing 175,547 cubic yards of standard ballasting in main line tracks; rearranging and constructing additional track, extending second track, passing sidings, sidings and team tracks at sundry points; purchasing and rehabilitating 2900 feet of track at Madison, N. C., for use as siding; automatic signals, switching signals and lights and grade crossing signals were installed at various locations; signal pole lines were reconstructed on Lynchburg Belt Line from Phoebe to Forest, Va., on Low Grade Line from Burkeville to Pamplin, Va., and Roanoke, Va., to Winston-Salem, N. C.; reconstruction of three bridges on Mate Creek Branch, installation of concrete deck bridge span at Bentonville, Va., construction of concrete railtop culvert at Cornwall, Va., and of eight concrete overhead highway bridges in Virginia and Ohio; and elimination of fifteen grade crossings by road changes, underpasses and overhead bridges.

The Company sustained damage to roadway and equipment estimated at $761.000 from the unprecedented flood in the Ohio River Valley in January, 1937. About 150 miles of track were submerged, a large portion to a depth of twelve feet. The main line from Kenova, W. Va., to Columbus, Ohio, a distance of 137.26 miles, was out of operation for eleven days, and the line from Portsmouth, Ohio, to Cincinnati, Ohio, a distance of 100.20 miles, for fifteen days. It is estimated that this interruption to traffic has caused a loss of revenue amounting to $1,310,000.

Eighty-eight new industries located on the Company's line, producing foods, textiles, lumber, paper, chemicals, petroleum and miscellaneous products, with a total capitalization of $15,225,000, and employing 8,900 persons. Seventy-one additions to established plants were completed, costing $5,418,900 and employing 3,695 persons. Four new coal mines were placed in operation and six abandoned. At the close of the year there were 127 companies organized for producing coal and coke on the Company's lines, with a total of 182 separate mines, of which 143 were in operation.

The operated mileage of the Company was 2,177.49 miles. Including .23 of a mile of leased line and 27.06 miles operated under trackage rights, the first main track mileage was 2,204.78 miles and the total mileage of all tracks was 4,648.10 miles.

The Railroad Retirement Act of 1935 and its companion tax Act have been the subject of litigation by the railroads on the ground of unconstitutionality. On June 26, 1936, the Supreme Court of the District of Columbia enjoined collection of taxes under the tax Act. During the year the Company has withheld from employees 3½ per cent. upon compensation up to $300 per month, and has accrued a like amount as its portion of the tax, but has made no payments as yet to the United States Treasury. By congressional resolution the tax Act, which terminated on February 28, 1937, was extended to June 30, 1938. Meanwhile, negotiations have been under way between representatives of the railroads and their employees to formulate acceptable railroad retirement legislation for submission to the Congress, which it is hoped will be equitable to railroad investors and users.

During 1936 the Social Security Act required the payment by the Company of a tax of one per cent. upon payrolls to the Unemployment Trust Fund, which amounted to $340,124.53. The rate of tax increases to two per cent. in 1937 and three per cent. in 1938 and thereafter. The States through which the Company operates have adopted Unemployment Compensation Laws which entitle them to receive ninety per cent. of the tax provided for by the Federal Act, the balance being reserved for the Federal Unemployment Trust Fund.

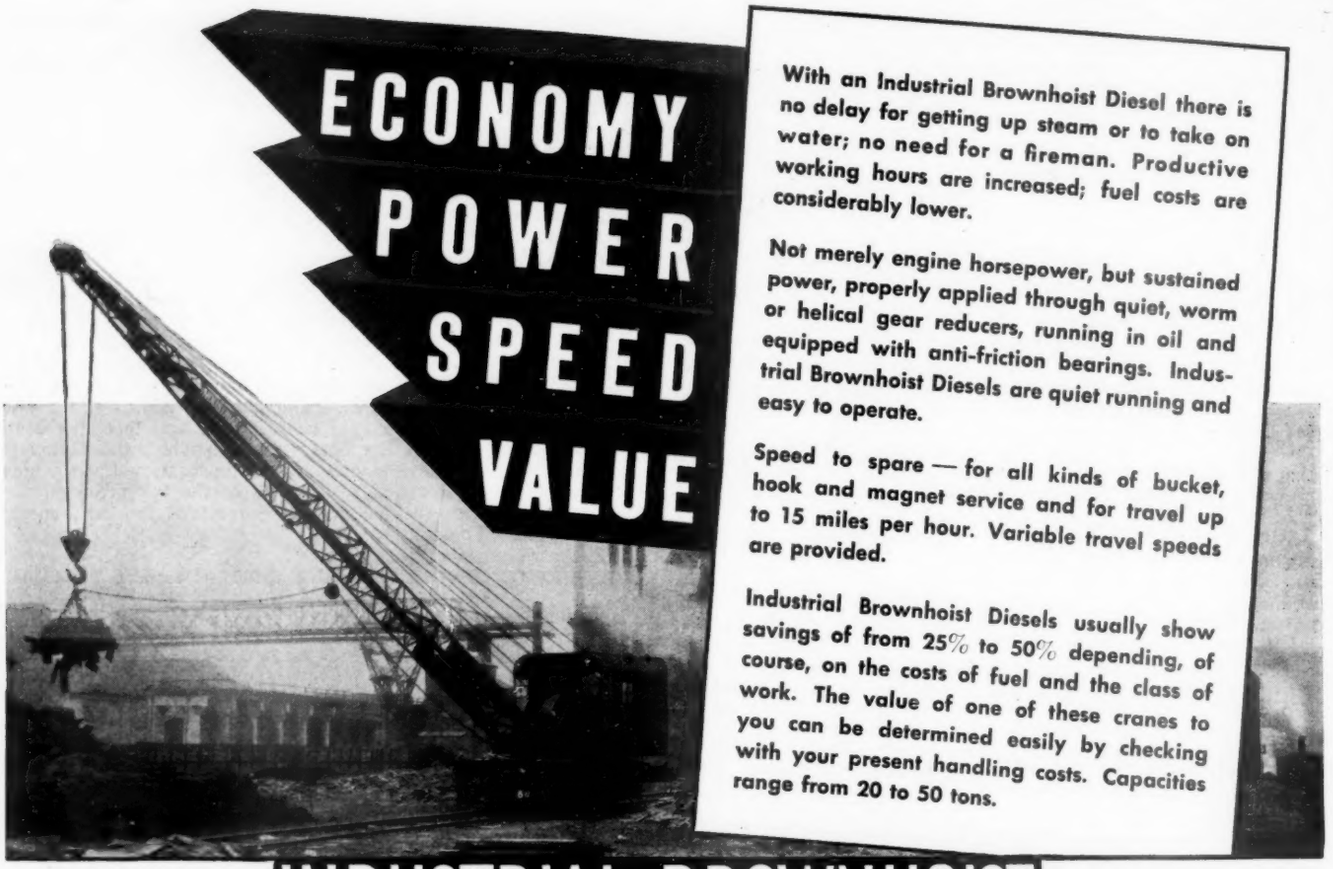
CONDENSED GENERAL BALANCE SHEET—December 31, 1936

	1936	Increase or Decrease
ASSETS		
Investments:		
Investment in Road	$335,874,436.44	I. $7,436,702.21
Investment in Equipment Owned	132,714,248.35	I. 4,746,629.65
Improvements on leased railway property	.....	D. 17,473.97
Sinking Funds and other Deposits	1,838,286.41	I. 193,759.09
Miscellaneous Physical Property	4,843,808.11	D. 402,787.41
Investment in Affiliated Companies	15,073,031.00	I. 6,606,330.41
Other Investments	13,378,643.23	D. 6,945,021.67
Total Investments	$503,722,453.54	I. $11,618,138.25
Current Assets:		
Cash	$16,255,384.12	I. $7,413,892.28
Material and Supplies	5,350,364.79	D. 599,795.64
Other Current Assets	7,159,177.21	I. 1,126,144.97
Total Current Assets	$28,764,926.12	I. $7,940,241.61
Deferred Assets	$3,616,456.13	D. $10,042,247.64
Norfolk and Western-Pocahontas Joint Bonds, Relief Fund Securities, etc.		
Unadjusted Debits	$4,361,244.84	I. $1,220,154.43
Total	$540,465,080.63	I. $10,736,286.65
LIABILITIES		
Capital Stock:		
Adjustment Preferred	$22,992,300.00	.....
Common	140,648,300.00	.....
Total Capital Stock	$163,640,600.00	.....
Long Term Debt:		
Mortgage Bonds	$46,053,500.00	.....
Miscellaneous	6,086,031.92	.....
Total Long Term Debt	$52,139,531.92	.....
Current Liabilities	$6,597,659.96	D. $1,062,655.90
Traffic and Car Service Balances, Accounts Payable, Interest and Dividends Matured and Unpaid, Unmatured Dividends Declared, etc.		
Deferred and Joint Liabilities	$3,607,992.84	D. $10,051,559.36
Norfolk and Western-Pocahontas Joint Bonds, Relief Fund Securities, etc.		
Unadjusted Credits:		
Accrued Depreciation	$64,735,711.65	I. $2,940,597.21
Tax Liability, Insurance Reserves, etc.	16,214,221.62	I. 6,431,347.06
Total Unadjusted Credits	$80,949,933.27	I. $9,371,944.27
Corporate Surplus:		
Sinking Fund Reserves	$1,390,373.47	I. $197,134.33
Additions to Property through Income and Surplus—Road	21,581,087.29	I. 155,844.88
Equipment	23,305,326.27	.....
Funded Debt Retired through Income and Surplus	47,234,000.00	.....
Profit and Loss Balance	140,018,575.61	I. 12,125,578.43
Total Corporate Surplus	$233,529,362.64	I. $12,478,557.64
Total	$540,465,080.63	I. $10,736,286.65

By order of the Board of Directors.

W. J. JENKS,
President.

[Advertisement]



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Not merely engine horsepower, but sustained power, properly applied through quiet, worm or helical gear reducers, running in oil and equipped with anti-friction bearings. Industrial Brownhoist Diesels are quiet running and easy to operate.

Speed to spare — for all kinds of bucket, hook and magnet service and for travel up to 15 miles per hour. Variable travel speeds are provided.

Industrial Brownhoist Diesels usually show savings of from 25% to 50% depending, of course, on the costs of fuel and the class of work. The value of one of these cranes to you can be determined easily by checking with your present handling costs. Capacities range from 20 to 50 tons.

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